通信协议V2.0

本协议定义PC端软件与Graseby系列注射泵、输液泵的通信数据格式，通信机制为应答式（即由PC端进行命令发起，泵端回应）。

# 命令格式

（小端模式）

命令由命令头、命令ID和若干字段组成，字段可以任意组合，字段组合存放于Payload Data区域，命令格式如下定义：

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Start Of Message（0x0B）** | | | | | | | |
| **0x1C** | | | | | | | |
| **Sequence ID** | | | | | | | |
| **Request/Response** | | | | | | | |
| **Product ID（0x00~0xFE）0xFF表示此条命令不区分设备型号** | | | | | | | |
| **Message ID(Low)** | | | | | | | |
| **Message ID(High)** | | | | | | | |
| **Timestamp(UTC)** | | | | | | | |
| **Payload length （2 bytes）** | | | | | | | |
| **Payload Data字段1** | | | | | | | |
| **Payload Data字段2** | | | | | | | |
| **………** | | | | | | | |
| **Checksum(CRC)32位** | | | | | | | |

## Start Of Message

命令开始标识位：**0x0B, 0x1C**

## Sequence ID

命令序列标识，从0到255循环。

## Request/Response

标记此命令是请求还是响应。**Request = 0**，**Response = 1**

## Product ID

设备标识0x00~0xFE：0xFF表示此条命令不区分设备型保留使用,设备代码如下表所示：

|  |  |
| --- | --- |
| Graseby™ C8 | 0x00 |
| Graseby™ C9 | 0x01 |
| Graseby™ C10 | 0x02 |
| Graseby™ F8 | 0x03 |
| Graseby™ C6 | 0x04 |
| Graseby™ F6 | 0x05 |
| Graseby™ 1200 | 0x06 |
| Graseby™ F8 Channel1 | 0x07 |
| Graseby™ F8 Channel2 | 0x08 |
| Graseby™ C6T | 0x09 |
| Graseby™ 2000 | 0x0A |
| Graseby™ 2100 | 0x0B |

## Message ID

表示两个字节为命令ID，可以有效使用65536个ID。

## Timestamp

每条命令自带时间戳，格式为UTC（如：20100706154719+0800）用9个字节来存储。

其中Year是表示2000年以后的年数。如：2016表示成16

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **(UTC)Year( base 2000 )** | | | | | | | |
| **(UTC)Moth** | | | | | | | |
| **(UTC)Day** | | | | | | | |
| **(UTC)Hour** | | | | | | | |
| **(UTC)Minute** | | | | | | | |
| **(UTC)Second** | | | | | | | |
| **(UTC)+或-** | | | | | | | |
| **(UTC)Hour** | | | | | | | |
| **(UTC)Minute** | | | | | | | |

## Payload length

Payload Data数据体长度

## Payload Data

Payload length长度的数据体，详见第2部分字段定义。

## Checksum

算法请见4.7章节

# 字段

字段是命令的组成部分，每条命令可以包含0到多个字段，每个字段是单独的数据体。字段由三个组成部分：字段头、数据长度，数据体。每个字段最小长度为4字节。字段头用一个16位的无符号数表示。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **字段头（0x0000~0xFFFF）** | | | | | | | | | | | | | | | |
| **数据长度（0x000~0xFFF）** | | | | | | | | | | | | | | | |
| **Data** | | | | | | | | | | | | | | | |
| **Continue Data …..** | | | | | | | | | | | | | | | |

字段ID列表如下：

|  |  |  |
| --- | --- | --- |
| **字段** | **字段头ID** | **应用** |
| 2.1自定义字段 | 0x0001 | GPA\TAA\ Infosys |
| 2.2 报警信息 | 0x0002 | Infosys & Wifi Box |
| 2.3速率 | 0x0003 |  |
| 2.4输注速率单位 | 0x0004 |  |
| 2.5 VTBI | 0x0005 |  |
| 2.6累计量 | 0x0006 |  |
| 2.7KVO | 0x0007 |  |
| 2.8日期时间 | 0x0008 |  |
| 2.9体积单位 | 0x0009 |  |
| 2.10输注时间 | 0x000A |  |
| 2.11多速率(TAA) | 0x000B |  |
| 2.12剂量 | 0x000C |  |
| 2.13剂量单位 | 0x000D |  |
| 2.14体重 | 0x000E |  |
| 2.15重量单位 | 0x000F |  |
| 2.16药量 | 0x0010 |  |
| 2.17药量单位 | 0x0011 |  |
| 2.18容量 | 0x0012 |  |
| ­ACK | 0x0013 | GPA/TAA/… |
| 2.20序列号 | 0x0014 |  |
| 2.21文件头信息 | 0x0015 | GUA |
| 2.22文件块信息 | 0x0016 | GUA |
| 2.23文件结束信息 | 0x0017 | GUA |
| 2.24 固件版本号 | 0x0018 | GPA/GUA/ FCT |
| 2.25 电池低电耗尽持续时间 | 0x0019 |  |
| 2.26 电压值 | 0x001A |  |
| 2.27 压力等级 | 0x001B |  |
| 2.28 输注模式 | 0x001C |  |
| 2.29品牌 | 0x001D |  |
| 2.30规格 | 0x001E |  |
| 2.31注射器数据 | 0x001F |  |
| 2.32电源状态 | 0x0020 |  |
| 2.33报警信息 | 0x0021 |  |
| 2.34传感器状态 | 0x0022 |  |
| 2.35电池状态 | 0x0023 |  |
| 2.36多速率(GPA) | 0x0024 |  |
|  |  |  |
|  | 0x1000 | *GPA* |
|  | 0x1001 | *GPA* |
|  | 0x1002 | *GPA* |
|  | 0x1003 | *GPA* |
|  | 0x1004 | *GPA* |
|  | 0x1005 | *GPA* |
|  | 0x1006 | *GPA* |
|  | 0x1007 | *GPA* |
|  | 0x1008 | *GPA* |
|  | 0x1009 | *GPA* |
|  | 0x100A | *GPA* |
|  | 0x100B | *GPA* |
|  | 0x100C | *GPA* |
| *……* | *……~0x0FFF* | *GPA* |

## 自定义字段

由用户自己填充相关数据。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **数据长度=?** | | | | | | | | | | | | | | | | |
| **Data1** | | | | | | | | | **Data2** | | | | | | | |
| **Data3** | | | | | | | | | **Data…..** | | | | | | | |

## ~~报警信息~~

~~只适用于WiFi Box！~~

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ~~0~~ | ~~1~~ | ~~2~~ | ~~3~~ | ~~4~~ | ~~5~~ | ~~6~~ | ~~7~~ | | ~~8~~ | ~~9~~ | ~~10~~ | ~~11~~ | ~~12~~ | ~~13~~ | ~~14~~ | ~~15~~ |
| **~~字段头~~** | | | | | | | | | | | | | | | | |
| **~~数据长度=0x0002~~** | | | | | | | | | | | | | | | | |
| **~~Alarm byte 0~~** | | | | | | | | **~~Alarm byte 1~~** | | | | | | | | |

~~对于Alarm的定义，暂分成两大类：泵端Alarm和非泵端Alarm（如：泵与WIFIBOX断连等异常情况）。~~

* ~~在泵端Alarm的定义存储在4个字节的空间中，每一bit代表一种Alarm类型，不超过32种Alarm，但是由于历史原因，各种泵对Alarm的位定义不尽相同，所以需要统一格式，将不同的Alarm映射到指定的新格式中。用低位1字节表示。~~

1. ~~GrasebyC6/F6/C6T/2000/2100的Alarm相同，占用0x01~0x20区间。~~

~~GrasebyC8/F8的Alarm相同，占用0x21~0x40区间。~~

1. ~~Graseby1200 中文版Alarm与英文版稍有区别，可单独占用0x41~0x60区间。~~
2. ~~GrasebyC9 Alarm占用0x61~0x80区间。~~
3. ~~0x80~0xFF可预留用于Alarm扩展。~~
4. ~~泵端Alarm可由GET\_PUMP\_ALARM（详情请见老版本协议）命令来获取~~

* ~~非泵端Alarm定义区间单独占用1字节（Alarm byte 1）。~~
* ~~报警字符串描述定义请见~~**~~错误!未找到引用源。~~**

## 速率

速率字段不限大小由具体数值决定，第一个字节必须是放大倍数（泵端处理浮点数效率低）。最小长度为6个字节。默认单位：mL/h。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0004** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **Rate 1** | | | | | | | |
| **Rate 2** | | | | | | | | | **Rate3** | | | | | | | |

## 输注速率单位

速率单位字段包含速率单位ID。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Infusion Rate Unit | | | | | | | | |

## VTBI

VTBI字段包含放大倍数和放大后的数据，默认单位：mL。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0002~0xFFFF** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **VTBI 1** | | | | | | | |
| **VTBI 2** | | | | | | | | | **VTBI …** | | | | | | | |

## 累计量

累计量字段包含放大倍数和放大后的数据，默认单位：mL。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0002~0xFFFF** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **Total 1** | | | | | | | |
| **Total 2** | | | | | | | | | **Total …** | | | | | | | |

## KVO

KVO字段包含放大倍数和放大后的数据，默认单位：mL。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0002~0xFFFF** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **KVO1** | | | | | | | |
| **KVO 2** | | | | | | | | | **KVO…** | | | | | | | |

## 日期时间

日期和时间字段包含日期和时间（24小时制），格式：yyyy-MM-dd hh:mm:ss

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0007** | | | | | | | | | | | | | | | | |
| **Year Low** | | | | | | | | **Year High** | | | | | | | | |
| **Month** | | | | | | | | **Day** | | | | | | | | |
| **Hour** | | | | | | | | **Minute** | | | | | | | | |
| **Second** | | | | | | | |

## 体积单位

体积单位字段包含体积单位ID。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Volume Unit | | | | | | | | |

## 输注时间

输注时间字段包含小时和分钟。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | |
| 字段头 | | | | | | | | | | | | | | | | | |
| **0x0002** | | | | | | | | | | | | | | | | | |
| **Hour** | | | | | | | | | **Minute** | | | | | | | |

## 多速率(TAA)

多速率字段不限大小由具体数值决定。

第一个字节是第几个速率，1代表速率1，2代表速率2，依次类推；

第二个字节必须是速率单位；

第三个字节必须是放大倍数。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0004~0xFFFF** | | | | | | | | | | | | | | | | |
| **Index** | | | | | | | | | Infusion Rate Unit | | | | | | | |
| Scale Value | | | | | | | | | **Rate 1** | | | | | | | |
| **Rate 2** | | | | | | | | | **Rate …** | | | | | | | |

## 剂量

剂量字段不限大小由具体数值决定，第一个字节必须是放大倍数。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0002~0xFFFF** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **Dose 1** | | | | | | | |
| **Dose 2** | | | | | | | | | **Dose …** | | | | | | | |

## 剂量单位

剂量单位字段包含剂量单位ID。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Dose Unit | | | | | | | | |

## 体重

体重字段不限大小由具体数值决定，第一个字节必须是放大倍数。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0002~0xFFFF** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **Weight 1** | | | | | | | |
| **Weight 2** | | | | | | | | | **Weight …** | | | | | | | |

## 重量单位

体重单位字段包含体重单位ID。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Weight Unit | | | | | | | | |

## 药量

药量字段不限大小由具体数值决定，第一个字节必须是放大倍数。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0002~0xFFFF** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **Drug Solution 1** | | | | | | | |
| **Drug Solution 2** | | | | | | | | | **Drug Solution …** | | | | | | | |

## 药量单位

药量单位字段包含药量单位ID。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Drug Solution Unit | | | | | | | | |

## 容量

容量字段不限大小由具体数值决定，第一个字节必须是放大倍数。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0002~0xFFFF** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **Volume 1** | | | | | | | |
| **Volume 2** | | | | | | | | | **Volume …** | | | | | | | |

## ­ACK

命令错误返回字段，包含当前错误的命令ID及确认error no。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 0x13 | | | | | | | | | | | | | | | | |
| **长度=0x0003** | | | | | | | | | | | | | | | | |
| **Message ID（Low）** | | | | | | | | | **Message ID（High）** | | | | | | | |
| Error No | | | | | | | | |

## 序列号

序列号由多个字符组成，长度不固定。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| 长度=？ | | | | | | | | | | | | | | | | |
| **Data1** | | | | | | | | **Data2** | | | | | | | | |
| **Data3** | | | | | | | | **Data…** | | | | | | | | |

## 文件头信息

文件头信息包含文件ID、Sub ID（某些类型文件由很多子文件，Sub ID表示子文件顺序号，例如：上传LOGO）、文件大小校验和以及文件块个数。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x000C** | | | | | | | | | | | | | | | | |
| File Type | | | | | | | | **Sub ID** | | | | | | | | |
| **FileSize byte(4 bytes)** | | | | | | | | | | | | | | | | |
| **Checksum byte(4 bytes)** | | | | | | | | | | | | | | | | |
| **Block count (2 byte)** | | | | | | | | | | | | | | | | |

## 文件块信息

文件块信息，包含文件ID、子ID、文件数据块顺序号和文件块数据。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0006~?** | | | | | | | | | | | | | | | | |
| File Type | | | | | | | | **Sub ID** | | | | | | | | |
| **Sequence number (4 bytes)** | | | | | | | | | | | | | | | | |
| **Data1** | | | | | | | | **Data2** | | | | | | | | |
| **Data3** | | | | | | | | **Data…** | | | | | | | | |

## 文件结束信息

文件传输结束信息，包含文件ID、子ID以及传输结果：

* Request

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0003** | | | | | | | | | | | | | | | | |
| File Type | | | | | | | | **Sub ID** | | | | | | | | |
| ­Send File Result | | | | | | | |

## 固件版本号

固件版本号由四部分组成分别为：**Major Version、Minor Version、Revision Version、Build Number Version**，其中Major Version占一个字节，Minor Version、Revision Version各占两个字节。Build Number Version占四个字节。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x000A** | | | | | | | | | | | | | | | | |
| Firmware Type | | | | | | | | **Major Version Byte** | | | | | | | | |
| **Minor Version Low Byte** | | | | | | | | **Minor Version High Byte** | | | | | | | | |
| **Revision Version Low Byte** | | | | | | | | **Revision Version High Byte** | | | | | | | | |
| **Build Number Version (4 bytes)** | | | | | | | | | | | | | | | | |

## 电池低电耗尽持续时间

电池低电耗尽持续时间单位为：秒，低电和耗尽持续时间各占两字节。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | |
| **0x0004** | | | | | | | | | | | | | | | |
| **Low battery duration (2 bytes)** | | | | | | | | | | | | | | | |
| **Deplete battery duration (2 bytes)** | | | | | | | | | | | | | | | |

## 电压值

电压值字段包含放大倍数和放大后的数据，默认单位：V。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0003** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **Volatge low byte** | | | | | | | |
| **Volatge high byte** | | | | | | | | |

## 压力等级

压力等级字段包含压力等级ID。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Pressure Level | | | | | | | | |

## 输注模式

输注模式字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Infusion Mode | | | | | | | | |

## 品牌

品牌字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | |

## 规格

规格字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| **Size** | | | | | | | | |

## 注射器数据

注射器字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | |
| **0x002A** | | | | | | | | | | | | | | | |
| **external\_diameter\_min, unit: 0.01mm(2 bytes)** | | | | | | | | | | | | | | | |
| **external\_diameter\_max,unit: 0.01mm(2 bytes)** | | | | | | | | | | | | | | | |
| **capacity\_length, unit: 0.01mm(2 bytes)** | | | | | | | | | | | | | | | |
| **flange\_plunger\_length, unit: 0.01mm(2 bytes)** | | | | | | | | | | | | | | | |
| **sectional\_area, unit: 0.01mm (4 bytes, signed)** | | | | | | | | | | | | | | | |
| **pressure reverse volume 1;unit:0.001mL (2 bytes, unsigned)** | | | | | | | | | | | | | | | |
| **pressure reverse volume 2;unit:0.001mL (2 bytes, unsigned)** | | | | | | | | | | | | | | | |
| **pressure reverse volume 3;unit:0.001mL (2 bytes, unsigned)** | | | | | | | | | | | | | | | |
| **pressure reverse volume 4;unit:0.001mL (2 bytes, unsigned)** | | | | | | | | | | | | | | | |
| **pressure reverse volume 5;unit:0.001mL (2 bytes, unsigned)** | | | | | | | | | | | | | | | |
| **is\_for\_neonate, unit: 0.01mm(4 bytes, signed)** | | | | | | | | | | | | | | | |
| **friction\_weight,** **unit:g(4 bytes, signed)** | | | | | | | | | | | | | | | |
| **factor\_for\_P(4 bytes, signed)** | | | | | | | | | | | | | | | |
| **factor\_of\_sectional\_area\_for\_low\_speed(4 bytes, signed)** | | | | | | | | | | | | | | | |
| **factor\_of\_sectional\_area\_for\_high\_speed(4 bytes, signed)** | | | | | | | | | | | | | | | |

## 电源状态

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Power Status | | | | | | | | |

## 报警信息

报警信息字段包含报警ID,4个字节的报警信息，每一bit代表一种

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0000~0xFFFF** | | | | | | | | | | | | | | | | |
| **Alarm 0** | | | | | | | | **Alarm 1** | | | | | | | | |
| **Alarm 2** | | | | | | | | **Alarm 3** | | | | | | | | |

## 传感器状态

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Sensor Status | | | | | | | | |

## 电池状态

电池状态分为两种：是否在充电、电池目前的电量

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Battery charge status | | | | | | | | | Battery status | | | | | | | |

## 多速率(GPA)

多速率字段由3组速率和时间组成。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0012­** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **Rate 1** | | | | | | | |
| **Rate 1** | | | | | | | | | **Rate 1** | | | | | | | |
| **Hour** | | | | | | | | | **Minute** | | | | | | | |
| Scale Value | | | | | | | | | **Rate 2** | | | | | | | |
| **Rate 2** | | | | | | | | | **Rate 2** | | | | | | | |
| **Hour** | | | | | | | | | **Minute** | | | | | | | |
| Scale Value | | | | | | | | | **Rate 3** | | | | | | | |
| **Rate 3** | | | | | | | | | **Rate 3** | | | | | | | |
| **Hour** | | | | | | | | | **Minute** | | | | | | | |

# 命令组成

所有命令由0或多个字段组成，均存放在Payload Data区域。本节介绍的内容均为此区域内的命令的组成格式。包括由外部程序传递给泵端的请求，及泵端的应答。

命令列表如下：

|  |  |  |
| --- | --- | --- |
| **命令** | **命令ID** | **应用** |
| 普通用户权限 | 0x0000~0x07FFF |  |
| 3.1GET\_PRODUCTID | 0x0000 |  |
| 3.2INVALID\_COMMAND | 0x0001 |  |
| 3.3SEND\_FILE\_START | 0x0002 | GUA |
| 3.4SEND\_FILE\_PACKAGE | 0x0003 | GUA |
| 3.5SEND\_FILE\_COMPLETED | 0x0004 | GUA |
| 3.6GET\_FIRMWARE\_VERSION | 0x0005 | GUA/GPA/ FCT |
| 3.7GET\_CURRENT\_MODE | 0x0006 | GUA/GPA |
| 3.8RESET\_PUMPMODE | 0x0007 | GUA |
| 3.9GET\_SERIAL\_NUMBER | 0x0008 | GPA/GBA |
| 3.10GET\_SUPPORTED\_MAX\_FILE\_SIZE | 0x0009 | GUA |
|  |  |  |
| 3.11GET\_PUMP\_ALARM | 0x0100 | GPA/GBA |
| 3.48GET\_KVO | 0x0101 | GPA |
| 3.13GET\_DATE\_TIME | 0x0102 | GPA |
| 3.14GET\_OCCLUSION\_LEVEL | 0x0103 | GPA |
| 3.15GET\_MAINTENANCE\_DATE\_TIME | 0x0104 | GPA |
| 3.16GET\_MAINTENANCE\_PERIOD | 0x0105 | GPA |
| 3.17GET\_ALARM\_VOLUME | 0x0106 | GPA |
| 3.18GET\_BRIGHTNESS | 0x0107 | GPA |
| 3.19GET\_NIGHTMODE\_PERIOD | 0x0108 | GPA |
| 3.20GET\_PUMP\_LANGUAGE | 0x0109 | GPA |
| 3.21GET\_LOG\_TOTAL\_NUM | 0x010A | GPA |
| 3.22GET\_LOG | 0x010B | GPA |
| 3.23GET\_POWER\_STATUS | 0x010C | GPA/GBA |
| 3.24GET\_SENSOR\_STATUS | 0x010D | GPA |
| 3.25GET\_INFUSION\_MODE | 0x010E | GPA |
| 3.26GET\_SYRINGE\_BRAND | 0x010F | GPA |
| 3.27GET\_DOSE\_UINT | 0x0110 | GPA |
| 3.28GET\_CURRENT\_DRUG | 0x0111 | GPA |
| 3.29GET\_INFUSION\_PARAMETER | 0x0112 | GPA |
| 3.30GET\_BATTERY\_ALARM\_DURATION | 0x0113 | GPA |
| 3.31GET\_LOCK\_PASSWORD | 0x0116 | GPA |
| 3.32GET\_SECURITY\_SWITCH | 0x0117 | GPA |
| 3.33GET\_COMPLETE\_INFUSION\_ALARM\_TIME | 0x0118 | GPA |
| 3.34GET\_ALARM\_SOUND\_TYPE | 0x0119 | GPA |
| 3.35GET\_CUSTOMBRAND\_CALIPARA | 0x011A | GPA |
| 3.36GET\_PRESELECTON\_BRAND | 0x011B | GPA |
| 3.37GET\_CALI\_CUSTOM\_BRAND | 0x011C | GPA |
| 3.38GET\_ALARMTYPE\_PASSWORD | 0x011D | GPA |
| 3.39GET\_INFUSING\_PARAMETER\_OF\_MODE | 0x011E | GPA |
| 3.40GET\_SYSTEM\_STATUS | 0x011F | INFUSYS |
|  |  |  |
| Infosys已占用0x1000~0x1005 | 0x1000~0x10FF | Infosys |
|  | 0x2000~0x2FFF |  |
| 3.40SET\_OCCLUSION\_LEVEL | 0x2000 | GPA |
| 3.41SET\_INFUSION\_MODE | 0x2001 | GPA/GBA |
| 3.42SET\_DATE\_TIME | 0x2002 | GPA |
| 3.43SET\_ALARM\_VOLUME | 0x2003 | GPA |
| 3.44SET\_BRIGHTNESS | 0x2004 | GPA |
| 3.45SET\_NIGHTMODE\_PERIOD | 0x2005 | GPA |
| 3.46SET\_SYRINGE\_BRAND | 0x2006 | GPA |
| 3.47SET\_DOSE\_UINT | 0x2007 | GPA |
| 3.48SET\_KVO | 0x2008 | GPA |
| 3.49SET\_CURRENT\_DRUG | 0x2009 | GPA |
| 3.50SET\_INFUSION\_PARAMETER | 0x200A | GPA/GBA |
| 3.51SET\_LOCK\_PASSWORD | 0x200B | GPA |
| 3.52SET\_SECURITY\_ SWITCH | 0x200C | GPA |
| 3.53SET\_COMPLETE\_INFUSION\_ALARM\_TIME | 0x200D | GPA |
| 3.54SET\_ALARM\_SOUND\_TYPE | 0x200E | GPA |
| 3.55SET\_CUSTOMBRAND\_CALIPARA | 0x200F | GPA |
| 3.56CLEAR\_ALL\_CUSTOMBRAND\_CALIPARA | 0x2010 | GPA |
| 3.57SET\_PRESELECTON\_BRAND | 0x2011 | GPA |
| 3.58SET\_ALARMTYPE\_PASSWORD | 0x2012 | GPA |
| 3.59CLEAR\_CUSTOMBRAND\_CALIPARA | 0x2013 | GPA |
| 维护权限 | 0x3000~0x3FFF |  |
| 3.60SET\_MAINTENANCE\_PERIOD | 0x3000 | GPA |
| 3.61SET\_MAINTENANCE\_DATETIME | 0x3001 | GPA(FQC) |
| 工厂 | 0x4000~0x4FFF |  |
| 3.62GET\_PRESSURE\_SENSOR\_VALUE | 0x4000 | GPA |
| 3.63GET\_PRESSURE\_P\_VALUE | 0x4001 | GPA |
| 3.64GET\_PRESSURE\_FACTOR\_ABC | 0x4002 | GPA |
| 3.65GET\_SIZE\_SENSOR\_CALIBRATION\_FACTOR\_KP | 0x4003 | GPA |
| 3.66GET\_SIZE\_SENSOR\_VALUE | 0x4004 | GPA |
| 3.67GET\_BATTERY\_VOLTAGE | 0x4005 | GPA/GBA |
| 3.68GET\_SYRINGE\_BRAND\_NAME | 0x4006 | GPA |
| 3.69GET\_FIRMWARE\_DATA\_VERSION | 0x4007 | GPA |
|  | 0x5000~0x5FFF |  |
| 3.70SET\_PUMP\_LANGUAGE | 0x5000 | GPA |
| 3.71CLEAR\_HISTORY\_LOG | 0x5001 | GPA |
| 3.72SET\_SERIAL\_NUMBER | 0x5002 | GPA |
| 3.73SET\_UI\_USER\_DEFINE\_SYRINGE\_BRAND\_NAME | 0x5003 | GPA |
| 3.74RESTORE\_FACTORY\_SETTING | 0x5004 | GPA |
| 药库 | 0x6000~0x6FFF |  |
| 3.75GET\_ DRUG\_ITEM | 0x6000 | GPA |
| 3.76UPDATE\_DRUG\_ITEM | 0x6001 | GPA |
| 3.77GET\_CATEGORY\_ITEM | 0x6002 | GPA |
| 3.78UPDATE\_CATEGORY\_ITEM | 0x6003 | GPA |
| 3.79GET\_DRUG\_LIB\_COUNT | 0x6004 | GPA |
| 3.80GET\_CATEGORY\_COUNT | 0x6005 | GPA |
| 3.81CLEAR\_DRUG\_LIB | 0x6006 | GPA |
| 3.82GET\_LANGUAGE\_COUNT | 0x6007 | GPA |
| 3.83UPDATE\_CATEGORY\_DRUGINDEX | 0x6008 | GPA |
| 3.84GET\_CATEGORY\_DRUGINDEX | 0x6009 | GPA |
| 开发 | 0x7000~0x7FFF |  |
| 3.85GET\_OCCULSION\_PRESSURE\_THRESHOLD | 0x7000 | GPA |
| 3.86GET\_SYRINGE\_DATA | 0x7001 | GPA |
| 3.87GET\_INPUTS\_AT\_MAIN | 0x7002 | GPA |
| 3.88GET\_BATTERY\_THRESHOLD | 0x7003 | GPA |
| 3.89GET\_FLASH\_ADDRESS\_DATA | 0x7004 | GPA |
| 3.90GET\_FCT\_FLAG | 0x7005 | GPA |
| 3.91GET\_ADC\_REDRESS | 0x7006 | GPA |
| 3.92GET\_SYRINGE\_PRESSURE\_SELF\_CALI\_VALUE | 0x7007 | GPA |
| 3.93GET\_SYRINGE\_CALI\_FLAG | 0x7008 | GPA |
| 3.94GET\_APP\_IMG\_VALID\_FLAG | 0x7009 | GPA |
| 3.95GET\_UI\_DELIVERY\_SECURE\_CONFIG | 0x700A | GPA |
| 3.96GET\_SYRINGE\_SIZE\_CALI\_RANGE | 0x700B | GPA |
| 3.22GET\_LOG(未保护的历史纪录) | 0x700C | GPA |
| 3.97EXPORT\_FILE\_FROM\_PUMP\_START | 0x700D | GPA |
| 3.98EXPORT\_FILE\_FROM\_PUMP\_PACKAGE | 0x700E | GPA |
| 3.99EXPORT\_FILE\_FROM\_PUMP\_RESULT | 0x700F | GPA |
|  |  |  |
|  | 0x8000~0x8FFF |  |
| 3.100RESET\_SPI\_FLASH\_DATA | 0x8000 | GPA |
| 3.101SET\_OCCULSION\_PRESSURE\_THRESHOLD | 0x8001 | GPA |
| 3.102SET\_SYRINGE\_DATA | 0x8002 | GPA |
| 3.103SET\_ BATTERY\_THRESHOLD | 0x8003 | GPA |
| 3.104SET\_FLASH\_ADDRESS\_DATA | 0x8004 | GPA |
| 3.105WRITE\_LOG | 0x8005 | GPA |
| 3.106SET\_FCT\_FLAG | 0x8006 | GPA |
| 3.107SET\_ADC\_REDRESS | 0x8007 | GPA |
| 3.108SET\_PRESSURE\_P\_VALUE | 0x8008 | GPA |
| 3.109SET\_SYRINGE\_PRESSURE\_SELF\_CALI\_VALUE | 0x8009 | GPA |
| 3.110SET\_SYRINGE\_CALI\_FLAG | 0x800A | GPA |
| 3.111SET\_APP\_IMG\_VALID\_FLAG | 0x800B | GPA |
| 3.112SET\_UI\_DELIVERY\_SECURE\_CONFIG | 0x800C | GPA |
| 3.113SET\_PRESSURE\_FACTOR\_ABC | 0x800D | GPA |
| 3.114SET\_SIZE\_SENSOR\_CALIBRATION\_FACTOR\_KP | 0x800E | GPA |
| 3.115SET\_SYRINGE\_SIZE\_CALI\_RANGE | 0x800F | GPA |
| 3.116REMOTE\_STARTSTOP\_INFUSION | 0x8010 | Remote |
| 3.117IMPORT\_FILE\_TO\_PUMP\_START | 0x8011 | GPA |
| 3.118IMPORT\_FILE\_TO\_PUMP\_PACKAGE | 0x8012 | GPA |
| 3.119IMPORT\_FILE\_TO\_PUMP\_RESULT | 0x8013 | GPA |
|  |  |  |
|  |  |  |
| TAA | 0x9000~0x9FFF |  |
| 3.120ROLLBACK\_VOLUME | 0x9000 | TAA |
| 3.121GET\_SCREEN\_VALUE | 0x9001 | TAA |
| 3.122GET\_TITLE\_HINT | 0x9002 | TAA |
| 3.123FORWARD\_VOLUME | 0x9003 | TAA |
| 3.124STOP\_MOTOR | 0x9004 | TAA |
| 3.125GET\_RIGHT\_AREA\_SCREEN\_VALUE | 0x9005 | TAA |
| 3.126GET\_CURSOR\_POS\_IN\_SCREEN | 0x9006 | TAA |
| FCT | 0xA000~0xA00F |  |
| 3.127ISFCTMODE | 0xA000 | FCT |
| 3.128GET\_TESTCASE\_COUNT | 0xA001 | FCT |
| 3.129GET\_TESTCASE\_ITEM | 0xA002 | FCT |
| 3.130GET\_TESTCASE\_HINT | 0xA003 | FCT |
| 3.131TRIGGER\_TESTCASE\_ITEM | 0xA004 | FCT |
|  |  |  |

## GET\_PRODUCTID

请求设备ID，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据,其中**Product ID=0xFF**

* Response

返回一个Payload length为0的空数据,其中**Product ID=当前设备ID**

## INVALID\_COMMAND

泵端接收到命令的响应方式有三种：

* 可正常解析，正常返回
* 可以解析出**S**equence ID和Message ID，但数据体不完整，或数据不正确。此时需要返回本节定义的命令。
* 无法解析出**S**equence ID和Message ID，不返回，上位机作超时处理。

此命令由泵端返回，当泵端接收到的命令不完整，或无法解析时，可以返回此命令，包含一个­ACK字段，数据格式如下定义：

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **Start Of Message（0x0B）** | | | | | | | |
| **0x1C** | | | | | | | |
| **Sequence ID** | | | | | | | |
| **Response** | | | | | | | |
| **Product ID（0x00~0xFE）0xFF表示此条命令不区分设备型号** | | | | | | | |
| INVALID\_COMMAND | | | | | | | |
| INVALID\_COMMAND | | | | | | | |
| **Timestamp(UTC)** | | | | | | | |
| **Payload length = 0x07** | | | | | | | |
| ­ACK | | | | | | | |
| **Checksum(CRC)32位** | | | | | | | |

## SEND\_FILE\_START

发送文件头信息，在上传文件时需要将目标文件的基本信息上传到泵端。

* Request

1. 文件头信息

* Response

正常返回：泵端返回一个空的数据包。

## SEND\_FILE\_PACKAGE

发送文件分块数据，包含文件ID、子ID、文件数据块顺序号和文件块数据。

* Request

1. 文件块信息

* Response

正常返回：泵端返回一个空的数据包。

## SEND\_FILE\_COMPLETED

发送文件传输结束命令，包含文件ID、子ID以及传输结果：

* Request

1. 文件结束信息

* Response

正常返回：

1. 文件结束信息

## GET\_FIRMWARE\_VERSION

获取固件版本号命令，包括四个部分的版本号（MainFirmware、UIFirmware、MainBootloader、UIBootloader）：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回版本号定义如下：

1. 固件版本号（MainFirmware）
2. 固件版本号（UIFirmware）
3. 固件版本号（MainBootloader）
4. 固件版本号（UIBootloader）

## GET\_CURRENT\_MODE

获取泵的当前模式，泵的模式有正常模式和bootloader模式：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| ­Pump Mode | | | | | | | |

## RESET\_PUMPMODE

设置泵的当前模式，泵的模式有正常模式和bootloader模式：

* Request

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| ­Pump Mode | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## GET\_SERIAL\_NUMBER

获取泵的序列号：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个自定义字段, 序列号由多个字符组成，长度不固定。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| 长度=？ | | | | | | | | | | | | | | | | |
| **Data1** | | | | | | | | **Data2** | | | | | | | | |
| **Data3** | | | | | | | | **Data…** | | | | | | | | |

## GET\_SUPPORTED\_MAX\_FILE\_SIZE

查询可支持的固件文件大小，命令包含字段如下：

* Request

1. 自定义字段,包含文件类型

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| File Type | | | | | | | |

* Response

正常返回：自定义字段,包含文件类型和文件大小

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0005** | | | | | | | | | | | | | | | | |
| File Type | | | | | | | | **MAX file size(4 bytes)** | | | | | | | | |

## GET\_PUMP\_ALARM

查询泵报警信息，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

泵端返回一个包含自定义字段的数据包,包含报警优先级和报警ID

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x000?** | | | | | | | | | | | | | | | | |
| Alarm level **1** | | | | | | | | | Alarm ID **1** | | | | | | | |
| Alarm level **2** | | | | | | | | | Alarm ID **2** | | | | | | | |
| **…** | | | | | | | | | **…** | | | | | | | |

## GET\_KVO

查询KVO，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

泵端返回一个包含自定义字段的数据包

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0005** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **KVO(Low byte)** | | | | | | | |
| **KVO(Mid byte)** | | | | | | | | | **KVO(Mid byte)** | | | | | | | |
| **KVO(high byte)** | | | | | | | | |

## GET\_DATE\_TIME

获取当前模式下的日期时间，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0007** | | | | | | | | | | | | | | | | |
| **Year Low** | | | | | | | | **Year High** | | | | | | | | |
| **Month** | | | | | | | | **Day** | | | | | | | | |
| **Hour** | | | | | | | | **Minute** | | | | | | | | |
| **Second** | | | | | | | |

## GET\_OCCLUSION\_LEVEL

读取当前压力等级：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，包含压力等级

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Pressure Level | | | | | | | | |

## GET\_MAINTENANCE\_DATE\_TIME

读取上一次维护日期时间和下一次维护日期时间，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，包含上一次维护日期时间和下一次维护日期时间。日期和时间字段包含日期和时间（24小时制），格式：yyyy-MM-dd hh:mm:ss

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0000E** | | | | | | | | | | | | | | | | |
| **Last Maintenance Year Low** | | | | | | | | **Last Year High** | | | | | | | | |
| **Last Month** | | | | | | | | **Last Day** | | | | | | | | |
| **Last Hour** | | | | | | | | **Last Minute** | | | | | | | | |
| **Last Second** | | | | | | | | **Next Maintenance Year Low** | | | | | | | | |
| **Next Year High** | | | | | | | | **Next Month** | | | | | | | | |
| **Next Day** | | | | | | | | **Next Hour** | | | | | | | | |
| **Next Minute** | | | | | | | | **Next Second** | | | | | | | | |

## GET\_MAINTENANCE\_PERIOD

读取维护周期（单位：月），命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，1个字节整型值。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **1~255** | | | | | | | | |

## GET\_ALARM\_VOLUME

读取报警音量值

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，音量范围（0~4）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **volume(0~4)** | | | | | | | | |

## GET\_BRIGHTNESS

读取屏幕亮度

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，范围（0~9）。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **brightness(0~9)** | | | | | | | | |

## GET\_NIGHTMODE\_PERIOD

读取夜间模式时间段

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包(24小时制， 时：分——时：分)。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0004** | | | | | | | | | | | | | | | | |
| **Begin hour** | | | | | | | | | **Begin munite** | | | | | | | |
| **End hour** | | | | | | | | | **End munite** | | | | | | | |

## GET\_PUMP\_LANGUAGE

读取泵的当前语言

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=2** | | | | | | | | | | | | | | | | |
| Language | | | | | | | | | Region | | | | | | | |

## GET\_LOG\_TOTAL\_NUM

获取历史纪录总数

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，四个字节无符号整型值。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=0x0004** | | | | | | | | | | | | | | | |
| **Log total number(4byte)** | | | | | | | | | | | | | | | |

## GET\_LOG

获取指定历史纪录

* Request

向泵端发送一个自定义字段,包含历史纪录的序号,从1开始。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=0x0004** | | | | | | | | | | | | | | | |
| **Log sequence num(4byte)** | | | | | | | | | | | | | | | |

* Response

正常返回：泵端返回一个包含自定义字段的数据包,包含一条历史纪录信息。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=0x00??** | | | | | | | | | | | | | | | |
| **Log sequence num(4byte)** | | | | | | | | | | | | | | | |
| **timestamp(4 byte， 2000年以后的秒数)** | | | | | | | | | | | | | | | |
| **summary length (2 bytes)** | | | | | | | | | | | | | | | |
| **Summary bytes** | | | | | | | | | | | | | | | |
| **admin\_detail length(2 bytes)** | | | | | | | | | | | | | | | |
| **admin\_detail bytes** | | | | | | | | | | | | | | | |

## GET\_POWER\_STATUS

读电源状态

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回电源状态定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=3** | | | | | | | | | | | | | | | | |
| Power Status | | | | | | | | | Battery charge status | | | | | | | |
| Battery status | | | | | | | | |

## GET\_SENSOR\_STATUS

读传感器状态

* Request

向泵端发送自定义字段,包含要读取的传感器的掩码。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=0x0004** | | | | | | | | | | | | | | | |
| Sensor Mask**(4byte)** | | | | | | | | | | | | | | | |

* Response

正常返回：泵端返回自定义字段, sensor mask包含一个或多个传感器,sensor status为sensor mask对应的传感器的状态：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=0x0008** | | | | | | | | | | | | | | | |
| Sensor Mask**(4byte)** | | | | | | | | | | | | | | | |
| Sensor Status**(4byte)** | | | | | | | | | | | | | | | |

## GET\_INFUSION\_MODE

设置输注模式：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回自定义字段如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Infusion Mode | | | | | | | | |

## GET\_SYRINGE\_BRAND

读注射器品牌

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回自定义字段如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | |

## GET\_DOSE\_UINT

读剂量单位

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Dose Unit | | | | | | | | |

## GET\_CURRENT\_DRUG

查询当前药名，在药名开关打开的情况下，输注界面显示当前正在输注的药名。命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，内容为药名索引。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=2** | | | | | | | | | | | | | | | | |
| **drug index low byte** | | | | | | | | | **drug index high byte** | | | | | | | |

## GET\_INFUSION\_PARAMETER

查询泵端4种输注模式所有参数，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：根据不同输注模式，返回的数据不同，如下所示。

1. **速率模式**

该模式下有时间和VTBI，命令包含字段如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x000B** | | | | | | | | | | | | | | | | |
| **Infusion Mode = 速率模式** | | | | | | | | | Scale Value | | | | | | | |
| **Rate 1(low byte)** | | | | | | | | | **Rate 1** | | | | | | | |
| **Rate 1** | | | | | | | | | **Rate 1(high byte)** | | | | | | | |
| Scale Value | | | | | | | | | **VTBI (low byte)** | | | | | | | |
| **VTBI** | | | | | | | | | **VTBI** | | | | | | | |
| **VTBI (high byte)** | | | | | | | | |

1. **多速率模式**

该模式下有3种不同的速率，命令包含字段如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0016** | | | | | | | | | | | | | | | | |
| **Infusion Mode= 多速率模式** | | | | | | | | | Scale Value | | | | | | | |
| **Rate 1(low byte)** | | | | | | | | | **Rate 1** | | | | | | | |
| **Rate 1** | | | | | | | | | **Rate 1(high byte)** | | | | | | | |
| **Hour** | | | | | | | | | **Minute** | | | | | | | |
| Scale Value | | | | | | | | | **Rate 2(low byte)** | | | | | | | |
| **Rate 2** | | | | | | | | | **Rate 2** | | | | | | | |
| **Rate 2(high byte)** | | | | | | | | | **Hour** | | | | | | | |
| **Minute** | | | | | | | | | Scale Value | | | | | | | |
| **Rate 3(low byte)** | | | | | | | | | **Rate 3** | | | | | | | |
| **Rate 3** | | | | | | | | | **Rate 3(high byte)** | | | | | | | |
| **Hour** | | | | | | | | | **Minute** | | | | | | | |

1. **时间模式**

该模式下有时间和VTBI参数，命令包含字段如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0008** | | | | | | | | | | | | | | | | |
| **Infusion Mode = 时间模式** | | | | | | | | | **Hour** | | | | | | | |
| **Minute** | | | | | | | | | Scale Value | | | | | | | |
| **VTBI (low byte)** | | | | | | | | | **VTBI** | | | | | | | |
| **VTBI** | | | | | | | | | **VTBI (high byte)** | | | | | | | |

1. **体重模式**

该模式下包含剂量、体重、药量、容量、限制量，命令包含字段如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x001B** | | | | | | | | | | | | | | | | |
| **Infusion Mode = 体重模式** | | | | | | | | | Scale Value | | | | | | | |
| **Dose (low byte)** | | | | | | | | | **Dose** | | | | | | | |
| **Dose** | | | | | | | | | **Dose(high byte)** | | | | | | | |
| Dose Unit | | | | | | | | | Scale Value | | | | | | | |
| **Weight (low byte)** | | | | | | | | | **Weight** | | | | | | | |
| **Weight** | | | | | | | | | **Weight(high byte)** | | | | | | | |
| Scale Value | | | | | | | | | **Drug Solution (low byte)** | | | | | | | |
| **Drug Solution** | | | | | | | | | **Drug Solution** | | | | | | | |
| **Drug Solution(high byte)** | | | | | | | | | Scale Value | | | | | | | |
| **Volume (low byte)** | | | | | | | | | **Volume** | | | | | | | |
| **Volume** | | | | | | | | | **Volume(high byte)** | | | | | | | |
| Scale Value | | | | | | | | | **VTBI (low byte)** | | | | | | | |
| **VTBI** | | | | | | | | | **VTBI** | | | | | | | |
| **VTBI (high byte)** | | | | | | | | |  | | | | | | | |

## GET\_BATTERY\_ALARM\_DURATION

读取电池的低电耗尽持续时间：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：一个自定义字段。电池低电耗尽持续时间单位为：秒，低电和耗尽持续时间各占两字节。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **0x0004** | | | | | | | | | | | | | | | |
| **Low battery duration (2 bytes)** | | | | | | | | | | | | | | | |
| **Deplete battery duration (2 bytes)** | | | | | | | | | | | | | | | |

## GET\_LOCK\_PASSWORD

查询锁定密码，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：一个自定义字段，包含4个字节的数字密码

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | |
| **0x0004** | | | | | | | | | | | | | | | |
| **Password(4 bytes)** | | | | | | | | | | | | | | | |

## GET\_SECURITY\_SWITCH

查询开关状态，命令包含字段如下：

* Request

向泵端发送自定义字段,包含要读取的开关的掩码。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=0x0004** | | | | | | | | | | | | | | | |
| Switch Mask **(4byte)** | | | | | | | | | | | | | | | |

* Response

正常返回：泵端返回自定义字段, Security Switch Mask包含一个或多个开关，Security Switch Status为Security SwitchMask对应的开关的状态：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=0x0008** | | | | | | | | | | | | | | | |
| Switch Mask **(4byte)** | | | | | | | | | | | | | | | |
| Switch Status **(4byte)** | | | | | | | | | | | | | | | |

## GET\_COMPLETE\_INFUSION\_ALARM\_TIME

查询即将输注完毕时间，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **0或3~10分钟** | | | | | | | | |

## GET\_ALARM\_SOUND\_TYPE

查询报警音类型，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **type(0~2)** | | | | | | | | |

## GET\_CUSTOMBRAND\_CALIPARA

查询自定义品牌自校准数据，命令包含字段如下：

* Request

向泵端发送一个自定义字段包含注射器规格和品牌

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=2** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Size | | | | | | | |

* Response

正常返回：一个自定义字段,包含标称刻度长度、标称尾部长度、最小外径、最大外径及校准状态, 单位mm。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=15** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Size | | | | | | | |
| Scale Value | | | | | | | | | 标称刻度长度(low byte) | | | | | | | |
| 标称刻度长度(high byte) | | | | | | | | | Scale Value | | | | | | | |
| 标称尾部长度(low byte) | | | | | | | | | 标称尾部长度(high byte) | | | | | | | |
| Scale Value | | | | | | | | | 最小外径(low byte) | | | | | | | |
| 最小外径( high byte) | | | | | | | | | Scale Value | | | | | | | |
| 最大外径(low byte) | | | | | | | | | 最大外径( high byte) | | | | | | | |
| 校准状态(0:未校准/1:已校准) | | | | | | | | |

## GET\_PRESELECTON\_BRAND

查询所有预选品牌，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：一个自定义字段,包含所有预选多个品牌

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=?** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Brand | | | | | | | |
| Brand | | | | | | | | | …… | | | | | | | |

## GET\_CALI\_CUSTOM\_BRAND

查询所有已经校准的自定义品牌，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：一个自定义字段,包含多个自定义品牌

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=?** | | | | | | | | | | | | | | | | |
| CustomBrand | | | | | | | | | CustomBrand | | | | | | | |
| CustomBrand | | | | | | | | | …… | | | | | | | |

## GET\_ALARMTYPE\_PASSWORD

查询进入报警音类型界面密码，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：一个自定义字段，包含4个字节的数字密码

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | |
| **0x0004** | | | | | | | | | | | | | | | |
| **Password(4 bytes)** | | | | | | | | | | | | | | | |

## GET\_INFUSING\_PARAMETER\_OF\_MODE

读取速率模式和时间模式下输注过程中的信息，命令如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：根据不同输注模式，返回的数据不同，如下所示。

1. **速率模式**

包含输注过程中的信息: 品牌,尺寸,速率,剩余时间,药物,压力,累计量,本次输注剩余量。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0022** | | | | | | | | | | | | | | | | |
| **Infusion Mode = 速率模式** | | | | | | | | | Brand | | | | | | | |
| **Size** | | | | | | | | | Scale Value | | | | | | | |
| **Current Rate byte 1** | | | | | | | | | **Current Rate byte 2** | | | | | | | |
| **Current Rate byte 3** | | | | | | | | | **Current Rate byte 4** | | | | | | | |
| **Remain Hour** | | | | | | | | | **Remain Minute** | | | | | | | |
| Pressure Level | | | | | | | | | **Drug lib** Switch Status | | | | | | | |
| **drug index low byte** | | | | | | | | | **drug index high byte** | | | | | | | |
| Scale Value | | | | | | | | | **Total byte 1** | | | | | | | |
| **Total byte 2** | | | | | | | | | **Total byte 3** | | | | | | | |
| **Total byte 4** | | | | | | | | | Scale Value | | | | | | | |
| **Remain Volume byte 1** | | | | | | | | | **Remain Volume byte 2** | | | | | | | |
| **Remain Volume byte 3** | | | | | | | | | **Remain Volume byte 4** | | | | | | | |
| Scale Value | | | | | | | | | **Bolus Rate byte 1** | | | | | | | |
| **Bolus Rate byte 2** | | | | | | | | | **Bolus Rate byte 3** | | | | | | | |
| **Bolus Rate byte 4** | | | | | | | | | Scale Value | | | | | | | |
| **Bolus VTBI byte 1** | | | | | | | | | **Bolus VTBI byte 2** | | | | | | | |
| **Bolus VTBI byte 3** | | | | | | | | | **Bolus VTBI byte 4** | | | | | | | |

1. **时间模式**

包含输注过程中的信息: 品牌,尺寸,速率,剩余时间,药物,压力,累计量,本次输注剩余量。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0022** | | | | | | | | | | | | | | | | |
| **Infusion Mode = 时间模式** | | | | | | | | | Brand | | | | | | | |
| **Size** | | | | | | | | | Scale Value | | | | | | | |
| **Current Rate byte 1** | | | | | | | | | **Current Rate byte 2** | | | | | | | |
| **Current Rate byte 3** | | | | | | | | | **Current Rate byte 4** | | | | | | | |
| **Remain Hour** | | | | | | | | | **Remain Minute** | | | | | | | |
| Pressure Level | | | | | | | | | **Drug lib** Switch Status | | | | | | | |
| **drug index low byte** | | | | | | | | | **drug index high byte** | | | | | | | |
| Scale Value | | | | | | | | | **Total byte 1** | | | | | | | |
| **Total byte 2** | | | | | | | | | **Total byte 3** | | | | | | | |
| **Total byte 4** | | | | | | | | | Scale Value | | | | | | | |
| **Remain Volume byte 1** | | | | | | | | | **Remain Volume byte 2** | | | | | | | |
| **Remain Volume byte 3** | | | | | | | | | **Remain Volume byte 4** | | | | | | | |
| Scale Value | | | | | | | | | **Bolus Rate byte 1** | | | | | | | |
| **Bolus Rate byte 2** | | | | | | | | | **Bolus Rate byte 3** | | | | | | | |
| **Bolus Rate byte 4** | | | | | | | | | Scale Value | | | | | | | |
| **Bolus VTBI byte 1** | | | | | | | | | **Bolus VTBI byte 2** | | | | | | | |
| **Bolus VTBI byte 3** | | | | | | | | | **Bolus VTBI byte 4** | | | | | | | |

1. **体重模式**

包含输注过程中的信息: 品牌,尺寸,速率,剂量,药物,压力,剩余时间,累计量,本次输注剩余量。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0028** | | | | | | | | | | | | | | | | |
| **Infusion Mode = 体重模式** | | | | | | | | | Brand | | | | | | | |
| **Size** | | | | | | | | | Scale Value | | | | | | | |
| **Current Rate byte 1** | | | | | | | | | **Current Rate byte 2** | | | | | | | |
| **Current Rate byte 3** | | | | | | | | | **Current Rate byte 4** | | | | | | | |
| **Remain Hour** | | | | | | | | | **Remain Minute** | | | | | | | |
| Pressure Level | | | | | | | | | **Drug lib** Switch Status | | | | | | | |
| **drug index low byte** | | | | | | | | | **drug index high byte** | | | | | | | |
| Scale Value | | | | | | | | | **Total byte 1** | | | | | | | |
| **Total byte 2** | | | | | | | | | **Total byte 3** | | | | | | | |
| **Total byte 4** | | | | | | | | | Scale Value | | | | | | | |
| **Remain Volume byte 1** | | | | | | | | | **Remain Volume byte 2** | | | | | | | |
| **Remain Volume byte 3** | | | | | | | | | **Remain Volume byte 4** | | | | | | | |
| Scale Value | | | | | | | | | **Bolus Rate byte 1** | | | | | | | |
| **Bolus Rate byte 2** | | | | | | | | | **Bolus Rate byte 3** | | | | | | | |
| **Bolus Rate byte 4** | | | | | | | | | Scale Value | | | | | | | |
| **Bolus VTBI byte 1** | | | | | | | | | **Bolus VTBI byte 2** | | | | | | | |
| **Bolus VTBI byte 3** | | | | | | | | | **Bolus VTBI byte 4** | | | | | | | |
| Scale Value | | | | | | | | | **Dose byte 1** | | | | | | | |
| **Dose byte 2** | | | | | | | | | **Dose byte 3** | | | | | | | |
| **Dose byte 4** | | | | | | | | | Dose Unit | | | | | | | |

1. **多速率模式**

包含输注过程中的信息: 品牌,尺寸,药物,压力,累计量,本次输注剩余量,多速率和剩余时间。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0030** | | | | | | | | | | | | | | | | |
| **Infusion Mode= 多速率模式** | | | | | | | | | Brand | | | | | | | |
| **Size** | | | | | | | | | Pressure Level | | | | | | | |
| **Drug lib** Switch Status | | | | | | | | | **drug index low byte** | | | | | | | |
| **drug index high byte** | | | | | | | | | Scale Value | | | | | | | |
| **Total byte 1** | | | | | | | | | **Total byte 2** | | | | | | | |
| **Total byte 3** | | | | | | | | | **Total byte 4** | | | | | | | |
| Scale Value | | | | | | | | | **Remain Volume byte 1** | | | | | | | |
| **Remain Volume byte 2** | | | | | | | | | **Remain Volume byte 3** | | | | | | | |
| **Remain Volume byte 4** | | | | | | | | | Scale Value | | | | | | | |
| **Bolus Rate byte 1** | | | | | | | | | **Bolus Rate byte 2** | | | | | | | |
| **Bolus Rate byte 3** | | | | | | | | | **Bolus Rate byte 4** | | | | | | | |
| Scale Value | | | | | | | | | **Bolus VTBI byte 1** | | | | | | | |
| **Bolus VTBI byte 2** | | | | | | | | | **Bolus VTBI 3** | | | | | | | |
| **Bolus VTBI 4** | | | | | | | | | Scale Value | | | | | | | |
| **Rate 1 byte1** | | | | | | | | | **Rate 1 byte2** | | | | | | | |
| **Rate 1 byte3** | | | | | | | | | **Rate 1 byte4** | | | | | | | |
| **Remain Hour1** | | | | | | | | | **Remain Minute1** | | | | | | | |
| Scale Value | | | | | | | | | **Rate 2 byte1** | | | | | | | |
| **Rate 2 byte2** | | | | | | | | | **Rate 2 byte3** | | | | | | | |
| **Rate 2 byte4** | | | | | | | | | **Remain Hour2** | | | | | | | |
| **Remain Minute2** | | | | | | | | | Scale Value | | | | | | | |
| **Rate 3 byte1** | | | | | | | | | **Rate 3 byte2** | | | | | | | |
| **Rate 3 byte3** | | | | | | | | | **Rate 3 byte4** | | | | | | | |
| **Remain Hour3** | | | | | | | | | **Remain Minute3** | | | | | | | |

## GET\_SYSTEM\_STATUS

查询当前系统状态，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：一个自定义字段，包含4个字节的数字密码

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | |
| System Status | | | | | | | | | | | | | | | |

## SET\_OCCLUSION\_LEVEL

设置当前压力等级：

* Request

向泵端发送一个自定义字段,包含压力等级

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Pressure Level | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_INFUSION\_MODE

设置输注模式：

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Infusion Mode | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_DATE\_TIME

设置当前模式下的日期时间，命令包含字段如下：

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0007** | | | | | | | | | | | | | | | | |
| **Year Low** | | | | | | | | **Year High** | | | | | | | | |
| **Month** | | | | | | | | **Day** | | | | | | | | |
| **Hour** | | | | | | | | **Minute** | | | | | | | | |
| **Second** | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_ALARM\_VOLUME

设置报警音量

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **volume(0~4)** | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_BRIGHTNESS

设置屏幕亮度

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **brightness(0~9)** | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_NIGHTMODE\_PERIOD

设置夜间模式时间段

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 |  | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0004** | | | | | | | | | | | | | | | | |
| **Begin hour** | | | | | | | | | **Begin munite** | | | | | | | |
| **End hour** | | | | | | | | | **End munite** | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_SYRINGE\_BRAND

设置注射器品牌

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_DOSE\_UINT

设置药库显示开关

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Dose Unit | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_KVO

查询KVO，命令包含字段如下：

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0005** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **KVO(Low byte)** | | | | | | | |
| **KVO(Mid byte)** | | | | | | | | | **KVO(Mid byte)** | | | | | | | |
| **KVO(high byte)** | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_CURRENT\_DRUG

设置当前输注的药名，在药名开关打开的情况下，设置需要输注的药名（上位机会自动同步泵的药库）。命令包含字段如下：

* Request

向泵端发送一个自定义字段，包含了药名在泵端的索引。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=2** | | | | | | | | | | | | | | | | |
| **drug index low byte** | | | | | | | | | **drug index high byte** | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_INFUSION\_PARAMETER

设置不同模式下的输注参数，不同的模式参数不同。

1. **速率模式**

* Request

该模式下需要设置时间和VTBI，命令包含字段如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x000B** | | | | | | | | | | | | | | | | |
| **Infusion Mode = 速率模式** | | | | | | | | | Scale Value | | | | | | | |
| **Rate 1(low byte)** | | | | | | | | | **Rate 1** | | | | | | | |
| **Rate 1** | | | | | | | | | **Rate 1(high byte)** | | | | | | | |
| Scale Value | | | | | | | | | **VTBI (low byte)** | | | | | | | |
| **VTBI** | | | | | | | | | **VTBI** | | | | | | | |
| **VTBI (high byte)** | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

1. **多速率模式**

* Request

该模式下需要设置3种不同的速率，命令包含字段如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0016** | | | | | | | | | | | | | | | | |
| **Infusion Mode= 多速率模式** | | | | | | | | | Scale Value | | | | | | | |
| **Rate 1(low byte)** | | | | | | | | | **Rate 1** | | | | | | | |
| **Rate 1** | | | | | | | | | **Rate 1(high byte)** | | | | | | | |
| **Hour** | | | | | | | | | **Minute** | | | | | | | |
| Scale Value | | | | | | | | | **Rate 2(low byte)** | | | | | | | |
| **Rate 2** | | | | | | | | | **Rate 2** | | | | | | | |
| **Rate 2(high byte)** | | | | | | | | | **Hour** | | | | | | | |
| **Minute** | | | | | | | | | Scale Value | | | | | | | |
| **Rate 3(low byte)** | | | | | | | | | **Rate 3** | | | | | | | |
| **Rate 3** | | | | | | | | | **Rate 3(high byte)** | | | | | | | |
| **Hour** | | | | | | | | | **Minute** | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

1. **时间模式**

* Request

该模式下需要设置时间和VTBI，命令包含字段如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0008** | | | | | | | | | | | | | | | | |
| **Infusion Mode = 时间模式** | | | | | | | | | **Hour** | | | | | | | |
| **Minute** | | | | | | | | | Scale Value | | | | | | | |
| **VTBI (low byte)** | | | | | | | | | **VTBI** | | | | | | | |
| **VTBI** | | | | | | | | | **VTBI (high byte)** | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

1. **体重模式**

* Request

该模式下需要设置剂量、体重、药量、容量、限制量，命令包含字段如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x001B** | | | | | | | | | | | | | | | | |
| **Infusion Mode = 体重模式** | | | | | | | | | Scale Value | | | | | | | |
| **Dose (low byte)** | | | | | | | | | **Dose** | | | | | | | |
| **Dose** | | | | | | | | | **Dose(high byte)** | | | | | | | |
| Dose Unit | | | | | | | | | Scale Value | | | | | | | |
| **Weight (low byte)** | | | | | | | | | **Weight** | | | | | | | |
| **Weight** | | | | | | | | | **Weight(high byte)** | | | | | | | |
| Scale Value | | | | | | | | | **Drug Solution (low byte)** | | | | | | | |
| **Drug Solution** | | | | | | | | | **Drug Solution** | | | | | | | |
| **Drug Solution(high byte)** | | | | | | | | | Scale Value | | | | | | | |
| **Volume (low byte)** | | | | | | | | | **Volume** | | | | | | | |
| **Volume** | | | | | | | | | **Volume(high byte)** | | | | | | | |
| Scale Value | | | | | | | | | **VTBI (low byte)** | | | | | | | |
| **VTBI** | | | | | | | | | **VTBI** | | | | | | | |
| **VTBI (high byte)** | | | | | | | | |  | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_LOCK\_PASSWORD

设置锁定密码，命令包含字段如下：

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | |
| **0x0004** | | | | | | | | | | | | | | | |
| **Password(4 bytes)** | | | | | | | | | | | | | | | |

* Response

正常返回：空

## SET\_SECURITY\_ SWITCH

设置编辑速率开关，命令包含字段如下：

* Request

向泵端发送一个自定义字段, , Security Switch Mask包含一个或多个开关，Security Switch Status为Security Switch Mask对应的开关的状态：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=0x0008** | | | | | | | | | | | | | | | |
| Switch Mask **(4byte)** | | | | | | | | | | | | | | | |
| Switch Status **(4byte)** | | | | | | | | | | | | | | | |

* Response

正常返回：空

## SET\_COMPLETE\_INFUSION\_ALARM\_TIME

设置即将输注完毕时间，命令包含字段如下：

* Request

向泵端发送一个一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **0或3~10分钟** | | | | | | | | |

* Response

正常返回：空

## SET\_ALARM\_SOUND\_TYPE

设置报警音类型，命令包含字段如下：

* Request

向泵端发送一个一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **type(0~2)** | | | | | | | | |

* Response

正常返回：空

## SET\_CUSTOMBRAND\_CALIPARA

设置自定义品牌自校准数据，命令包含字段如下：

* Request

向泵端发送一个自定义字段,包含标称刻度长度、标称尾部长度,测量外径,单位mm.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=11** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Size | | | | | | | |
| Scale Value | | | | | | | | | 标称刻度长度(low byte) | | | | | | | |
| 标称刻度长度(high byte) | | | | | | | | | Scale Value | | | | | | | |
| 标称尾部长度(low byte) | | | | | | | | | 标称尾部长度(high byte) | | | | | | | |
| Scale Value | | | | | | | | | 测量外径(low byte) | | | | | | | |
| 测量外径( high byte) | | | | | | | | |

* Response

正常返回：一个自定义字段,包含校准状态

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=3** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Size | | | | | | | |
| 校准状态(0:未校准/1:已校准) | | | | | | | | |

## CLEAR\_ALL\_CUSTOMBRAND\_CALIPARA

清除所有自校准数据，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：空

## SET\_PRESELECTON\_BRAND

查询所有预选品牌，命令包含字段如下：

* Request

向泵端发送一个自定义字段,包含所选定的多个品牌

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=?** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Brand | | | | | | | |
| Brand | | | | | | | | | …… | | | | | | | |

* Response

正常返回：空

## SET\_ALARMTYPE\_PASSWORD

设置报警音类型界面密码，命令包含字段如下：

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | |
| **0x0004** | | | | | | | | | | | | | | | |
| **Password(4 bytes)** | | | | | | | | | | | | | | | |

* Response

正常返回：空

## CLEAR\_CUSTOMBRAND\_CALIPARA

清除自定义品牌数据，命令包含字段如下：

* Request

向泵端发送一个自定义字段：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **Custom** Brand | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包

## SET\_MAINTENANCE\_PERIOD

设置维护周期（单位：月），命令包含字段如下：

* Request

向泵端发送一个自定义字段：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **1~255** | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_MAINTENANCE\_DATETIME

设置维护日期时间，命令包含字段如下：

* Request

向泵端发送一个自定义字段, 包含上一次维护日期时间, 日期和时间字段包含日期和时间（24小时制），格式：yyyy-MM-dd hh:mm:ss。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x00007** | | | | | | | | | | | | | | | | |
| **Maintenance Year byte1** | | | | | | | | **Maintenance Year byte2** | | | | | | | | |
| **Maintenance Month** | | | | | | | | **Maintenance Day** | | | | | | | | |
| **Maintenance Hour** | | | | | | | | **Maintenance Minute** | | | | | | | | |
| **Maintenance Second** | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## GET\_PRESSURE\_SENSOR\_VALUE

读取压力传感器值（ADC值、电压值、mmHg值），命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，包含三种形式的值（等价的，可相互转换）。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=12** | | | | | | | | | | | | | | | | |
| **ADC值（4 bytes 小端）** | | | | | | | | | | | | | | | | |
| **电压值(**Scale Value**)** | | | | | | | | | **电压值** | | | | | | | |
| **电压值** | | | | | | | | | **电压值** | | | | | | | |
| **mmHg(**Scale Value**)** | | | | | | | | | **mmHg** | | | | | | | |
| **mmHg** | | | | | | | | | **mmHg** | | | | | | | |

## GET\_PRESSURE\_P\_VALUE

获取P值(ADC值)：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：泵端返回定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| P(low byte) | | | | | | | | | P(high byte) | | | | | | | |

## GET\_PRESSURE\_FACTOR\_ABC

获取ABC因子：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回定义如下(A,B,C均为32位有符号整数)：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0C** | | | | | | | | | | | | | | | | |
| A(low byte) | | | | | | | | | A | | | | | | | |
| A | | | | | | | | | A(high byte) | | | | | | | |
| B(low byte) | | | | | | | | | B | | | | | | | |
| B | | | | | | | | | B(high byte) | | | | | | | |
| C(low byte) | | | | | | | | | C | | | | | | | |
| C | | | | | | | | | C(high byte) | | | | | | | |

## GET\_SIZE\_SENSOR\_CALIBRATION\_FACTOR\_KP

获取尺寸校准因子KP值：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：(K,P均为32位有符号整数)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x08** | | | | | | | | | | | | | | | | |
| K (low byte) | | | | | | | | | K | | | | | | | |
| K | | | | | | | | | K(high byte) | | | | | | | |
| P (low byte) | | | | | | | | | P | | | | | | | |
| P | | | | | | | | | P (high byte) | | | | | | | |

## GET\_SIZE\_SENSOR\_VALUE

读取尺寸传感器值（ADC值），命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，包含ADC值。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=2** | | | | | | | | | | | | | | | |
| **ADC值（2 bytes）** | | | | | | | | | | | | | | | |

## GET\_BATTERY\_VOLTAGE

读取电池电压：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，电压值字段包含放大倍数和放大后的数据，默认单位：V。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 字段头 | | | | | | | | | | | | | | | | |
| **0x0003** | | | | | | | | | | | | | | | | |
| Scale Value | | | | | | | | | **Volatge low byte** | | | | | | | |
| **Volatge high byte** | | | | | | | | |

## GET\_SYRINGE\_BRAND\_NAME

获取用户自定义品牌名称：

* Request

向泵端发送一个自定义字段，包含品牌ID.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0001** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | |

* Response

正常返回：泵端返回定义如下(品牌名称Name由20个字节存储)：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0015** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Name 0(low byte) | | | | | | | |
| Name 1 | | | | | | | | | Name 2 | | | | | | | |
| … | | | | | | | | | Name 19 | | | | | | | |

## GET\_FIRMWARE\_DATA\_VERSION

查询固件内部数据（UI Flash Data/Main Flash Data/Drug Library/Main Preset Syringe Data/Voice Image）版本号：

* Request

自定义字段,包含数据类型

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Firmware Type | | | | | | | |

* Response

正常返回：泵端返回版本号定义如下：

1. 固件版本号

## SET\_PUMP\_LANGUAGE

设置泵的当前语言

* Request

向泵端发送一个自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=2** | | | | | | | | | | | | | | | | |
| Language | | | | | | | | | Region | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## CLEAR\_HISTORY\_LOG

清除历史纪录

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个空的数据包。

## SET\_SERIAL\_NUMBER

设置泵的序列号：

* Request

向泵端发送一个自定义数据字段，序列号由多个字符组成，长度不固定。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| 长度=？ | | | | | | | | | | | | | | | | |
| **Data1** | | | | | | | | **Data2** | | | | | | | | |
| **Data3** | | | | | | | | **Data…** | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_UI\_USER\_DEFINE\_SYRINGE\_BRAND\_NAME

设置输注安全设置参数：

* Request

向泵端发送一个自定义数据字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0015** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Name 0(low byte) | | | | | | | |
| Name 1 | | | | | | | | | Name 2 | | | | | | | |
| … | | | | | | | | | Name 19 | | | | | | | |

* Response

正常返回：空

## RESTORE\_FACTORY\_SETTING

恢复出厂化设置：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个空的数据包。

## GET\_ DRUG\_ITEM

获取单条药名信息，包含：index（key id）、分类ID、flag、dose、concentration、语言、字符编码（药名及tips字符串的编码方式）、药名、tips等。字段定义如下：

* Request

向泵端发送一个drug index自定义字段。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0003** | | | | | | | | | | | | | | | | |
| **drug index low byte** | | | | | | | | | **drug index high byte** | | | | | | | |
| **language index** | | | | | | | | |

language index: 由泵端枚举定义，（0~N分别代表不同国家语言）

* Response

正常返回：泵端返回一个包含自定义字段的数据包，内容如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=？** | | | | | | | | | | | | | | | | |
| **drug index low byte** | | | | | | | | | **drug index high byte** | | | | | | | |
| Drug Item Flag | | | | | | | | | Language | | | | | | | |
| Encode | | | | | | | | | **drug name bytes length=64** | | | | | | | |
| **drug name** | | | | | | | | | **…** | | | | | | | |
| **tips string bytes length=64** | | | | | | | | | **tips string** | | | | | | | |
| **…** | | | | | | | | | **…** | | | | | | | |
| **dose lower limitation** Scale Value | | | | | | | | | **dose lower limitation byte 1** | | | | | | | |
| **dose lower limitation byte 2** | | | | | | | | | **dose lower limitation high byte 3** | | | | | | | |
| **dose lower limitation high byte 4** | | | | | | | | | **dose upper limitation** Scale Value | | | | | | | |
| **dose upper limitation byte 1** | | | | | | | | | **dose upper limitation byte 2** | | | | | | | |
| **dose upper limitation byte 3** | | | | | | | | | **dose upper limitation byte 4** | | | | | | | |
| **concentration** **lower limitation** Scale Value | | | | | | | | | **concentration** **lower limitation byte 1** | | | | | | | |
| **concentration** **lower limitation byte 2** | | | | | | | | | **concentration** **lower limitation byte 3** | | | | | | | |
| **concentration** **lower limitation byte 4** | | | | | | | | | **concentration** **upper limitation** Scale Value | | | | | | | |
| **concentration** **upper limitation byte 1** | | | | | | | | | **concentration** **upper limitation byte 2** | | | | | | | |
| **concentration** **upper limitation byte 3** | | | | | | | | | **concentration** **upper limitation byte 4** | | | | | | | |
| **Color(R)** | | | | | | | | | **Color(G)** | | | | | | | |
| **Color(B)** | | | | | | | | |

## UPDATE\_DRUG\_ITEM

更新或新增单条药名信息，包含：index（key id）、分类ID、flag、dose、concentration、语言、字符编码、药名、tips等。字段定义如下：

* Request

向泵端发送一个自定义字段：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=？** | | | | | | | | | | | | | | | | |
| **drug index low byte** | | | | | | | | | **drug index high byte** | | | | | | | |
| Drug Item Flag | | | | | | | | | Language | | | | | | | |
| Encode | | | | | | | | | **drug name bytes length=64** | | | | | | | |
| **drug name** | | | | | | | | | **…** | | | | | | | |
| **tips string bytes length=64** | | | | | | | | | **tips string** | | | | | | | |
| **…** | | | | | | | | | **…** | | | | | | | |
| **dose lower limitation** Scale Value | | | | | | | | | **dose lower limitation byte 1** | | | | | | | |
| **dose lower limitation byte 2** | | | | | | | | | **dose lower limitation high byte 3** | | | | | | | |
| **dose lower limitation high byte 4** | | | | | | | | | **dose upper limitation** Scale Value | | | | | | | |
| **dose upper limitation byte 1** | | | | | | | | | **dose upper limitation byte 2** | | | | | | | |
| **dose upper limitation byte 3** | | | | | | | | | **dose upper limitation byte 4** | | | | | | | |
| **concentration** **lower limitation** Scale Value | | | | | | | | | **concentration** **lower limitation byte 1** | | | | | | | |
| **concentration** **lower limitation byte 2** | | | | | | | | | **concentration** **lower limitation byte 3** | | | | | | | |
| **concentration** **lower limitation byte 4** | | | | | | | | | **concentration** **upper limitation** Scale Value | | | | | | | |
| **concentration** **upper limitation byte 1** | | | | | | | | | **concentration** **upper limitation byte 2** | | | | | | | |
| **concentration** **upper limitation byte 3** | | | | | | | | | **concentration** **upper limitation byte 4** | | | | | | | |
| **Color(R)** | | | | | | | | | **Color(G)** | | | | | | | |
| **Color(B)** | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## GET\_CATEGORY\_ITEM

获取单条分类信息，包含：categoryindex、语言、字符编码(分类名称字符串的编码方式)、分类名称等。字段定义如下：

* Request

向泵端发送一个category index自定义字段。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| **category index** | | | | | | | | | **language index** | | | | | | | |

language index: 由泵端枚举定义，（0~N分别代表不同国家语言）

* Response

正常返回：泵端返回一个包含自定义字段的数据包，内容如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=？** | | | | | | | | | | | | | | | | |
| **category index** | | | | | | | | | Language | | | | | | | |
| Encode | | | | | | | | | **category name bytes length** | | | | | | | |
| **category name** | | | | | | | | | **category name** | | | | | | | |
| **….** | | | | | | | | | **Color(R)** | | | | | | | |
| **Color(G)** | | | | | | | | | **Color(B)** | | | | | | | |

## UPDATE\_CATEGORY\_ITEM

更新单条分类信息，字段定义如下：

* Request

向泵端发送一个自定义字段：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=？** | | | | | | | | | | | | | | | | |
| **category index** | | | | | | | | | Language | | | | | | | |
| Encode | | | | | | | | | **category name bytes length=64** | | | | | | | |
| **category name** | | | | | | | | | **category name** | | | | | | | |
| **…** | | | | | | | | | **….** | | | | | | | |
| **Color(R)** | | | | | | | | | **Color(G)** | | | | | | | |
| **Color(B)** | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## GET\_DRUG\_LIB\_COUNT

获取药库总量，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，两个字节整型值。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| **drug count low byte** | | | | | | | | | **drug count high byte** | | | | | | | |

## GET\_CATEGORY\_COUNT

获取药库分类总量，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，一个字节整型值。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0001** | | | | | | | | | | | | | | | | |
| **category count** | | | | | | | | |

## CLEAR\_DRUG\_LIB

清空药库

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个空的数据包。

## GET\_LANGUAGE\_COUNT

获取泵语言总数，命令包含字段如下：

* Request

向泵端发送一个Payload length为0的空数据。

* Response

正常返回：泵端返回一个包含自定义字段的数据包，一个字节整型值。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0001** | | | | | | | | | | | | | | | | |
| **language count** | | | | | | | | |

例如：language count等于4，从0到3分别代表的语言类别，由泵端枚举定义。

## UPDATE\_CATEGORY\_DRUGINDEX

更新分类下所有药ID信息，字段定义如下：

* Request

向泵端发送一个自定义字段：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=？** | | | | | | | | | | | | | | | | |
| **category index** | | | | | | | | |
| **drug index count** | | | | | | | | | **Drug index 1(low byte)** | | | | | | | |
| **Drug index 1(high byte)** | | | | | | | | | **…** | | | | | | | |
| **Drug index N……(low byte)** | | | | | | | | | **Drug index N……(high byte)** | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## GET\_CATEGORY\_DRUGINDEX

更新分类下所有药ID信息，字段定义如下：

* Request

向泵端发送一个自定义字段：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x01** | | | | | | | | | | | | | | | | |
| **category index** | | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=?** | | | | | | | | | | | | | | | | |
| **category index** | | | | | | | | |
| **drug index count** | | | | | | | | | **Drug index 1(low byte)** | | | | | | | |
| **Drug index 1(high byte)** | | | | | | | | | **…** | | | | | | | |
| **Drug index N……(low byte)** | | | | | | | | | **Drug index N……(high byte)** | | | | | | | |

## GET\_OCCULSION\_PRESSURE\_THRESHOLD

获取压力档阀值：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：泵端返回定义如下：

1. 自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **0x000?** | | | | | | | | | | | | | | | |
| **Level1 threshold value(2 bytes)** | | | | | | | | | | | | | | | |
| **Level2 threshold value(2 bytes)** | | | | | | | | | | | | | | | |
| **Level3 threshold value(2 bytes)** | | | | | | | | | | | | | | | |
| **…** | | | | | | | | | | | | | | | |

## GET\_SYRINGE\_DATA

获取注射器数据：

* Request

向泵端发送一个自定义字段：

|  |  |
| --- | --- |
| **0x0001** | |
| **0x0002** | |
| Brand | **Size** |

* Response

正常返回：泵端返回一个自定义字段，包含品牌，尺寸和注射器数据：

|  |  |
| --- | --- |
| 字段头 | |
| **0x002C** | |
| Brand | **Size** |
| **external\_diameter\_min, unit: 0.01mm(2 bytes)** | |
| **external\_diameter\_max,unit: 0.01mm(2 bytes)** | |
| **capacity\_length, unit: 0.01mm(2 bytes)** | |
| **flange\_plunger\_length, unit: 0.01mm(2 bytes)** | |
| **sectional\_area, unit: 0.001mm^2 (4 bytes, signed)** | |
| **pressure reverse volume 1;unit:0.001mL (2 bytes, unsigned)** | |
| **pressure reverse volume 2;unit:0.001mL (2 bytes, unsigned)** | |
| **pressure reverse volume 3;unit:0.001mL (2 bytes, unsigned)** | |
| **pressure reverse volume 4;unit:0.001mL (2 bytes, unsigned)** | |
| **pressure reverse volume 5;unit:0.001mL (2 bytes, unsigned)** | |
| **is\_for\_neonate, unit: 0.01mm(4 bytes, signed)** | |
| **friction\_weight,** **unit:g(4 bytes, signed)** | |
| **factor\_for\_P(4 bytes, signed)** | |
| **factor\_of\_sectional\_area\_for\_low\_speed(4 bytes, signed)** | |
| **factor\_of\_sectional\_area\_for\_high\_speed(4 bytes, signed)** | |

## GET\_INPUTS\_AT\_MAIN

获取工程师模式下的监控值:

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：泵端返回定义如下：

1. 自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x000?** | | | | | | | | | | | | | | | | |
| **battery\_adc (2 bytes)** | | | | | | | | | | | | | | | | |
| **syringe\_size\_adc (2 bytes)** | | | | | | | | | | | | | | | | |
| **syringe\_size(2 bytes)** | | | | | | | | | | | | | | | | |
| **pressure\_adc(2 bytes)** | | | | | | | | | | | | | | | | |
| **Board temperature(2 bytes)** | | | | | | | | | | | | | | | | |
| **is\_alarm\_active\_from\_smcu** | | | | | | | | **is\_battery\_charge** | | | | | | | | |
| **is\_ac\_connect** | | | | | | | | **is\_pressure\_install** | | | | | | | | |
| **is\_syringe\_size\_install** | | | | | | | | **is\_halfNut\_lock** | | | | | | | | |
| **is\_plunger\_lock** | | | | | | | | **is\_wifi\_install** | | | | | | | | |
| **wifi\_status** | | | | | | | |  | | | | | | | | |

## GET\_BATTERY\_THRESHOLD

获取电池阀值：

* Request

向泵端发送一个自定义字段，包含参数：速率档

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0001** | | | | | | | | | | | | | | | | |
| Rate Range | | | | | | | |

* Response

正常返回：泵端返回定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x000B** | | | | | | | | | | | | | | | | |
| Rate Range | | | | | | | | **Off threshold value(low byte)** | | | | | | | | |
| **Off threshold value（high byte）** | | | | | | | | **Depleted threshold value(low byte)** | | | | | | | | |
| **Depleted threshold value(high byte)** | | | | | | | | **Low Battery threshold value(low byte)** | | | | | | | | |
| **Low Battery threshold value(high byte)** | | | | | | | | **One Block threshold value(low byte)** | | | | | | | | |
| **One Block threshold value(high byte)** | | | | | | | | **Two Block threshold value(low byte)** | | | | | | | | |
| **Two Block threshold value(high byte)** | | | | | | | |

## GET\_FLASH\_ADDRESS\_DATA

获取指定地址的数据：

* Request

1. 自定义字段,自定义字段包含Flash地址

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=4** | | | | | | | | | | | | | | | |
| **Flash address(4bytes)从1开始枚举** | | | | | | | | | | | | | | | |

* Response

正常返回：泵端返回定义如下：

1. 自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=8** | | | | | | | | | | | | | | | |
| **Flash address(4bytes)从1开始枚举** | | | | | | | | | | | | | | | |
| **Data(4 bytes)** | | | | | | | | | | | | | | | |

## GET\_FCT\_FLAG

获取FCT标识：

* Request

向泵端发送一个自定义数据字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0001** | | | | | | | | | | | | | | | | |
| **Role(1:main 0:UI)** | | | | | | | | |

* Response

正常返回：泵端返回定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| **Role(1:main 0:UI)** | | | | | | | | | **Fct\_flag** | | | | | | | |

## GET\_ADC\_REDRESS

获取ADC\_REDRESS值：

* Request

向泵端发送一个Payload length为0的空数据

* Response

正常返回：泵端返回定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x000C** | | | | | | | | | | | | | | | | |
| adc\_redress\_pressure byte1 (signed) | | | | | | | | | adc\_redress\_pressure byte2 (signed) | | | | | | | |
| adc\_redress\_size byte1 (signed) | | | | | | | | | adc\_redress\_size byte2 (signed) | | | | | | | |
| adc\_redress\_battery byte1 (signed) | | | | | | | | | adc\_redress\_battery byte2 (signed) | | | | | | | |
| adc\_redress\_near\_empty byte1 (signed) | | | | | | | | | adc\_redress\_near\_empty byte2 (signed) | | | | | | | |
| adc\_redress\_bat\_temp1 byte1 (signed) | | | | | | | | | adc\_redress\_bat\_temp1 byte2 (signed) | | | | | | | |
| adc\_redress\_bat\_temp2 byte1 (signed) | | | | | | | | | adc\_redress\_bat\_temp2 byte2 (signed) | | | | | | | |

## GET\_SYRINGE\_PRESSURE\_SELF\_CALI\_VALUE

获取注射器自定义压力校准值：

* Request

向泵端发送一个自定义数据字段,包含品牌和尺寸。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Size | | | | | | | |

* Response

正常返回：泵端返回定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0C** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Size | | | | | | | |
| pressure\_level 0 (low byte) | | | | | | | | | pressure level 0 (high byte) | | | | | | | |
| pressure\_level 1 (low byte) | | | | | | | | | pressure\_level 1 (high byte) | | | | | | | |
| pressure\_level 2 (low byte) | | | | | | | | | pressure\_level 2 (high byte) | | | | | | | |
| pressure\_level 3 (low byte) | | | | | | | | | pressure\_level 3 (high byte) | | | | | | | |
| pressure\_level 4 (low byte) | | | | | | | | | pressure\_level 4 (high byte) | | | | | | | |

## GET\_SYRINGE\_CALI\_FLAG

获取自定义品牌校准标识：

* Request

向泵端发送一个自定义字段，包含品牌和尺寸。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Size | | | | | | | |

* Response

正常返回：泵端返回定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Size | | | | | | | |
| cali\_flag | | | | | | | | |

## GET\_APP\_IMG\_VALID\_FLAG

获取固件升级标识：

* Request

向泵端发送一个Payload length为0的空数据.

* Response

正常返回：泵端返回定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| app\_img\_valid\_flag (low byte) | | | | | | | | | app\_img\_valid\_flag (high byte) | | | | | | | |

## GET\_UI\_DELIVERY\_SECURE\_CONFIG

获取输注安全设置参数：

* Request

向泵端发送一个Payload length为0的空数据.

* Response

正常返回：泵端返回定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0017** | | | | | | | | | | | | | | | | |
| change\_rate\_in\_run(1 byte) | | | | | | | | | lock\_in\_run(1 byte) | | | | | | | |
| saving\_last\_infusion\_programming(1 byte) | | | | | | | | |
| residual\_time(4 bytes) | | | | | | | | | | | | | | | | |
| alarm\_sound\_type(4 bytes) | | | | | | | | | | | | | | | | |
| inf\_safety\_passcode(4 bytes) | | | | | | | | | | | | | | | | |
| alarm\_type\_passcode(4 bytes) | | | | | | | | | | | | | | | | |
| brand\_pre\_choice(4 bytes) | | | | | | | | | | | | | | | | |

## GET\_SYRINGE\_SIZE\_CALI\_RANGE

获取注射器外径范围：

* Request

向泵端发送一个Payload length为0的空数据.

* Response

正常返回：泵端返回定义如下：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x14** | | | | | | | | | | | | | | | | |
| 5ml External\_diameter\_min(low byte) | | | | | | | | | 5ml External\_diameter\_min (high byte) | | | | | | | |
| 5ml External\_diameter\_max (low byte) | | | | | | | | | 5ml External\_diameter\_max (high byte) | | | | | | | |
| 10ml External\_diameter\_min(low byte) | | | | | | | | | 10ml External\_diameter\_min (high byte) | | | | | | | |
| 10ml External\_diameter\_max (low byte) | | | | | | | | | 10ml External\_diameter\_max (high byte) | | | | | | | |
| 20ml External\_diameter\_min(low byte) | | | | | | | | | 20ml External\_diameter\_min (high byte) | | | | | | | |
| 10ml External\_diameter\_max (low byte) | | | | | | | | | 10ml External\_diameter\_max (high byte) | | | | | | | |
| 30ml External\_diameter\_min(low byte) | | | | | | | | | 30ml External\_diameter\_min (high byte) | | | | | | | |
| 30ml External\_diameter\_max (low byte) | | | | | | | | | 30ml External\_diameter\_max (high byte) | | | | | | | |
| 50ml External\_diameter\_min(low byte) | | | | | | | | | 50ml External\_diameter\_min (high byte) | | | | | | | |
| 50ml External\_diameter\_max (low byte) | | | | | | | | | 50ml External\_diameter\_max (high byte) | | | | | | | |

## EXPORT\_FILE\_FROM\_PUMP\_START

从泵上获取要导出的文件信息：

* Request

向泵端发送一个自定义数据字段,包含文件类型.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0001** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段,包含文件类型,文件大小,校验码和文件分块总数：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0007** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | | **FileSize byte(4 bytes)** | | | | | | | | |
| **Block count (2 byte)** | | | | | | | | | | | | | | | | |

## EXPORT\_FILE\_FROM\_PUMP\_PACKAGE

从泵导出文件块：

* Request

向泵端发送一个自定义数据字段,包含文件类型,文件分块序号(从0开始)。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0003** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | | **Sequence number (2 bytes)** | | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段，包含文件类型,文件分块序号和文件块数据。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0003~?** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | | **Sequence number (2 bytes)** | | | | | | | | |
| **Data1** | | | | | | | | **Data2** | | | | | | | | |
| **Data3** | | | | | | | | **Data…** | | | | | | | | |

## EXPORT\_FILE\_FROM\_PUMP\_RESULT

完成或中断文件导出

* Request

向泵端发送一个自定义数据字段，包含文件导出结果。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0002** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | | ­Send File Result | | | | | | | | |

* Response

泵端返回一个自定义数据字段,包含文件类型,导出结果和导出文件的校验码。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x0006** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | | Send File Result | | | | | | | | |
| **Checksum byte(4 bytes)** | | | | | | | | | | | | | | | | |

## RESET\_SPI\_FLASH\_DATA

重置SPI flash 数据：

* Request

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **0x0004** | | | | | | | | | | | | | | | |
| Reset Command in SPI Flash **(4 byte)** | | | | | | | | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_OCCULSION\_PRESSURE\_THRESHOLD

设置压力档阀值：

* Request

1. 自定义字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **0x000?** | | | | | | | | | | | | | | | |
| **Level1 threshold value(2 bytes)** | | | | | | | | | | | | | | | |
| **Level2 threshold value(2 bytes)** | | | | | | | | | | | | | | | |
| **Level3 threshold value(2 bytes)** | | | | | | | | | | | | | | | |
| **…** | | | | | | | | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_SYRINGE\_DATA

* Request，

向泵端发送一个自定义字段，包含品牌，尺寸和注射器数据：

|  |  |
| --- | --- |
| 字段头 | |
| **0x002C** | |
| Brand | **Size** |
| **external\_diameter\_min, unit: 0.01mm(2 bytes)** | |
| **external\_diameter\_max,unit: 0.01mm(2 bytes)** | |
| **capacity\_length, unit: 0.01mm(2 bytes)** | |
| **flange\_plunger\_length, unit: 0.01mm(2 bytes)** | |
| **sectional\_area, unit: 0.001mm^2 (4 bytes, signed)** | |
| **pressure reverse volume 1;unit:0.001mL (2 bytes, unsigned)** | |
| **pressure reverse volume 2;unit:0.001mL (2 bytes, unsigned)** | |
| **pressure reverse volume 3;unit:0.001mL (2 bytes, unsigned)** | |
| **pressure reverse volume 4;unit:0.001mL (2 bytes, unsigned)** | |
| **pressure reverse volume 5;unit:0.001mL (2 bytes, unsigned)** | |
| **is\_for\_neonate, unit: 0.01mm(4 bytes, signed)** | |
| **friction\_weight,** **unit:g(4 bytes, signed)** | |
| **factor\_for\_P(4 bytes, signed)** | |
| **factor\_of\_sectional\_area\_for\_low\_speed(4 bytes, signed)** | |
| **factor\_of\_sectional\_area\_for\_high\_speed(4 bytes, signed)** | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_ BATTERY\_THRESHOLD

设置电池阀值：

* Request

向泵端发送一个自定义字段，包含参数：速率档及关机耗尽等情况下的电压值

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **0x000B** | | | | | | | | | | | | | | | | |
| Rate Range | | | | | | | | **Off threshold value(low byte)** | | | | | | | | |
| **Off threshold value（high byte）** | | | | | | | | **Depleted threshold value(low byte)** | | | | | | | | |
| **Depleted threshold value(high byte)** | | | | | | | | **Low Battery threshold value(low byte)** | | | | | | | | |
| **Low Battery threshold value(high byte)** | | | | | | | | **One Block threshold value(low byte)** | | | | | | | | |
| **One Block threshold value(high byte)** | | | | | | | | **Two Block threshold value(low byte)** | | | | | | | | |
| **Two Block threshold value(high byte)** | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_FLASH\_ADDRESS\_DATA

获取指定地址的数据：

* Request

1. 自定义字段,自定义字段包含Flash地址,数据

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=8** | | | | | | | | | | | | | | | |
| **Flash address(4bytes)从1开始枚举** | | | | | | | | | | | | | | | |
| **Data(4 bytes)** | | | | | | | | | | | | | | | |

* Response

正常返回：Payload length为0的空数据

## WRITE\_LOG

写入调试用的历史纪录

* Request

向泵端发送一个自定义字段，包含一个32位无符号整数，从0开始。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=0x0004** | | | | | | | | | | | | | | | |
| **Parameter(4 byte)** | | | | | | | | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## SET\_FCT\_FLAG

获取FCT标识：

* Request

向泵端发送一个自定义数据字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| **Role(1:main 0:UI)** | | | | | | | | | **Fct\_flag** | | | | | | | |

* Response

正常返回：泵端返回空。

## SET\_ADC\_REDRESS

设置ADC\_REDRESS值：

* Request

向泵端发送一个自定义数据字段,

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x000C** | | | | | | | | | | | | | | | | |
| adc\_redress\_pressure byte1 (signed) | | | | | | | | | adc\_redress\_pressure byte2 (signed) | | | | | | | |
| adc\_redress\_size byte1 (signed) | | | | | | | | | adc\_redress\_size byte2 (signed) | | | | | | | |
| adc\_redress\_battery byte1 (signed) | | | | | | | | | adc\_redress\_battery byte2 (signed) | | | | | | | |
| adc\_redress\_near\_empty byte1 (signed) | | | | | | | | | adc\_redress\_near\_empty byte2 (signed) | | | | | | | |
| adc\_redress\_bat\_temp1 byte1 (signed) | | | | | | | | | adc\_redress\_bat\_temp1 byte2 (signed) | | | | | | | |
| adc\_redress\_bat\_temp2 byte1 (signed) | | | | | | | | | adc\_redress\_bat\_temp2 byte2 (signed) | | | | | | | |

* Response

正常返回：空

## SET\_PRESSURE\_P\_VALUE

设置P值(ADC值)：

* Request

向泵端发送一个自定义数据字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| P(low byte) | | | | | | | | | P(high byte) | | | | | | | |

* Response

正常返回：空

## SET\_SYRINGE\_PRESSURE\_SELF\_CALI\_VALUE

设置注射器自定义压力校准值：

* Request

向泵端发送一个自定义数据字段,包含品牌、尺寸、压力参数

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0C** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Size | | | | | | | |
| pressure\_level 0 (low byte) | | | | | | | | | pressure level 0 (high byte) | | | | | | | |
| pressure\_level 1 (low byte) | | | | | | | | | pressure\_level 1 (high byte) | | | | | | | |
| pressure\_level 2 (low byte) | | | | | | | | | pressure\_level 2 (high byte) | | | | | | | |
| pressure\_level 3 (low byte) | | | | | | | | | pressure\_level 3 (high byte) | | | | | | | |
| pressure\_level 4 (low byte) | | | | | | | | | pressure\_level 4 (high byte) | | | | | | | |

* Response

正常返回：空

## SET\_SYRINGE\_CALI\_FLAG

设置自定义品牌校准标识：

* Request

向泵端发送一个自定义数据字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| Brand | | | | | | | | | Size | | | | | | | |
| cali\_flag | | | | | | | | |

* Response

正常返回：空

## SET\_APP\_IMG\_VALID\_FLAG

设置固件升级标识：

* Request

向泵端发送一个自定义数据字段，包含16位无符号整数的app\_img\_valid\_flag

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| app\_img\_valid\_flag (low byte) | | | | | | | | | app\_img\_valid\_flag (high byte) | | | | | | | |

* Response

正常返回：空

## SET\_UI\_DELIVERY\_SECURE\_CONFIG

设置输注安全设置参数：

* Request

向泵端发送一个自定义数据字段

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0017** | | | | | | | | | | | | | | | | |
| change\_rate\_in\_run(1 byte) | | | | | | | | | lock\_in\_run(1 byte) | | | | | | | |
| saving\_last\_infusion\_programming(1 byte) | | | | | | | | |
| residual\_time(4 bytes) | | | | | | | | | | | | | | | | |
| alarm\_sound\_type(4 bytes) | | | | | | | | | | | | | | | | |
| inf\_safety\_passcode(4 bytes) | | | | | | | | | | | | | | | | |
| alarm\_type\_passcode(4 bytes) | | | | | | | | | | | | | | | | |
| brand\_pre\_choice(4 bytes) | | | | | | | | | | | | | | | | |

* Response

正常返回：空

## SET\_PRESSURE\_FACTOR\_ABC

设置ABC因子：

* Request

向泵端发送一个自定义字段,(A,B,C均为32位有符号整数)：

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0C** | | | | | | | | | | | | | | | | |
| A(low byte) | | | | | | | | | A | | | | | | | |
| A | | | | | | | | | A(high byte) | | | | | | | |
| B(low byte) | | | | | | | | | B | | | | | | | |
| B | | | | | | | | | B(high byte) | | | | | | | |
| C(low byte) | | | | | | | | | C | | | | | | | |
| C | | | | | | | | | C(high byte) | | | | | | | |

* Response

返回一个Payload length为0的空数据。

## SET\_SIZE\_SENSOR\_CALIBRATION\_FACTOR\_KP

设置尺寸校准因子KP值：

* Request

向泵端发送一个自定义字段, (K,P均为32位有符号整数)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x08** | | | | | | | | | | | | | | | | |
| K (low byte) | | | | | | | | | K | | | | | | | |
| K | | | | | | | | | K(high byte) | | | | | | | |
| P (low byte) | | | | | | | | | P | | | | | | | |
| P | | | | | | | | | P (high byte) | | | | | | | |

* Response

返回一个Payload length为0的空数据。

## SET\_SYRINGE\_SIZE\_CALI\_RANGE

设置注射器外径范围：

* Request

向泵端发送一个自定义数据字段,包含各尺寸外径范围.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x14** | | | | | | | | | | | | | | | | |
| 5ml External\_diameter\_min(low byte) | | | | | | | | | 5ml External\_diameter\_min (high byte) | | | | | | | |
| 5ml External\_diameter\_max (low byte) | | | | | | | | | 5ml External\_diameter\_max (high byte) | | | | | | | |
| 10ml External\_diameter\_min(low byte) | | | | | | | | | 10ml External\_diameter\_min (high byte) | | | | | | | |
| 10ml External\_diameter\_max (low byte) | | | | | | | | | 10ml External\_diameter\_max (high byte) | | | | | | | |
| 20ml External\_diameter\_min(low byte) | | | | | | | | | 20ml External\_diameter\_min (high byte) | | | | | | | |
| 10ml External\_diameter\_max (low byte) | | | | | | | | | 10ml External\_diameter\_max (high byte) | | | | | | | |
| 30ml External\_diameter\_min(low byte) | | | | | | | | | 30ml External\_diameter\_min (high byte) | | | | | | | |
| 30ml External\_diameter\_max (low byte) | | | | | | | | | 30ml External\_diameter\_max (high byte) | | | | | | | |
| 50ml External\_diameter\_min(low byte) | | | | | | | | | 50ml External\_diameter\_min (high byte) | | | | | | | |
| 50ml External\_diameter\_max (low byte) | | | | | | | | | 50ml External\_diameter\_max (high byte) | | | | | | | |

* Response

正常返回：空：

## REMOTE\_STARTSTOP\_INFUSION

控制泵的启动停止，命令包含字段如下：

* Request

向泵端发送一个自定义字段，启动或停止泵。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0001** | | | | | | | | | | | | | | | | |
| **0:Stop ,1:Start** | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## IMPORT\_FILE\_TO\_PUMP\_START

向泵发送要导入的文件信息：

* Request

向泵端发送一个自定义数据字段,包含文件类型,文件大小,校验码和文件分块总数。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0007** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | | **FileSize byte(4 bytes)** | | | | | | | | |
| **Block count (2 byte)** | | | | | | | | | | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## IMPORT\_FILE\_TO\_PUMP\_PACKAGE

向泵导入文件块：

* Request

向泵端发送一个自定义数据字段,包含文件分块序号(从0开始)。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0003~?** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | | **Sequence number (2 bytes)** | | | | | | | | |
| **Data1** | | | | | | | | **Data2** | | | | | | | | |
| **Data3** | | | | | | | | **Data…** | | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段,包含文件类型,文件分块序号。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0003** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | | **Sequence number (2 bytes)** | | | | | | | | |

## IMPORT\_FILE\_TO\_PUMP\_RESULT

结束导入文件：

* Request

向泵端发送一个自定义数据字段,包含导入结果。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | | Send File Result | | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段，包含导入结果和校验码。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0006** | | | | | | | | | | | | | | | | |
| Import/Export File Type | | | | | | | | Send File Result | | | | | | | | |
| **Checksum byte(4 bytes)** | | | | | | | |

## ROLLBACK\_VOLUME

注射器回退一定的累计量，单位:0.001mL，命令包含字段如下：

* Request

向泵端发送一个自定义字段，传入4字节参数，让注射器回退指定的量。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0004** | | | | | | | | | | | | | | | | |
| **Volume** | | | | | | | | | **Volume** | | | | | | | |
| **Volume** | | | | | | | | | **Volume** | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## GET\_SCREEN\_VALUE

读屏幕内容，命令包含字段如下：

* Request

向泵端发送一个自定义字段，向泵端传入行列及屏幕ID三个参数

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0003** | | | | | | | | | | | | | | | | |
| **Row** | | | | | | | | | **Column** | | | | | | | |
| Screen ID | | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段数据包，包含行、列、屏幕ID、屏幕内容字节长度及字节数组(内容为字符串UTF8编码)。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度<=0x0104** | | | | | | | | | | | | | | | | |
| **Row** | | | | | | | | | **Column** | | | | | | | |
| Screen ID | | | | | | | | | **length** | | | | | | | |
| Data… | | | | | | | | | Data… | | | | | | | |

## GET\_TITLE\_HINT

读屏幕标题，命令包含字段如下：

* Request

向泵端发送一个自定义字段，传入一个字节参数，表示读取标题还是提示信息。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=1** | | | | | | | | | | | | | | | | |
| **Title:0 Hint:1** | | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段，包含标题字符串字节数组(UTF8编码)。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=？** | | | | | | | | | | | | | | | | |
| **Title:0 Hint:1** | | | | | | | | | **bytes length** | | | | | | | |
| **bytes** | | | | | | | | | **bytes…….** | | | | | | | |

## FORWARD\_VOLUME

注射器前进一定的累计量，单位:0.001mL，命令包含字段如下：

* Request

向泵端发送一个自定义字段，传入4字节参数，让注射器前进指定的量。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0004** | | | | | | | | | | | | | | | | |
| **Volume** | | | | | | | | | **Volume** | | | | | | | |
| **Volume** | | | | | | | | | **Volume** | | | | | | | |

* Response

正常返回：泵端返回一个空的数据包。

## STOP\_MOTOR

注射器停止推进或后退，命令包含字段如下：

* Request

向泵端发送一个空的数据包。

* Response

正常返回：泵端返回一个空的数据包。

## GET\_RIGHT\_AREA\_SCREEN\_VALUE

读屏幕Home右侧内容，命令包含字段如下：

* Request

向泵端发送一个空的数据包。

* Response

正常返回：泵端返回一个自定义字段数据包，包含阻塞等级，品牌，尺寸，累积量(内容为字符串UTF8编码)。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | |
| **数据长度=0x0032** | | | | | | | | | | | | | | | |
| **阻塞等级（10字节字符串utf8）** | | | | | | | | | | | | | | | |
| **品牌（20字节字符串utf8）** | | | | | | | | | | | | | | | |
| **尺寸（10字节字符串utf8）** | | | | | | | | | | | | | | | |
| **累积量（10字节字符串utf8）** | | | | | | | | | | | | | | | |

## GET\_CURSOR\_POS\_IN\_SCREEN

读取屏幕光标位置，命令包含字段如下：

* Request

向泵端发送一个空的数据包。

* Response

正常返回：泵端返回一个自定义字段数据包，包含光标所在行,列和屏幕ID。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0003** | | | | | | | | | | | | | | | | |
| **Row** | | | | | | | | | **Column** | | | | | | | |
| **Screen ID** | | | | | | | | |

## ISFCTMODE

查询泵是否在FCT模式，命令包含字段如下：

* Request

向泵端发送一个自定义字段。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0001** | | | | | | | | | | | | | | | | |
| **Role（1: Main board,0:UI board）** | | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0001** | | | | | | | | | | | | | | | | |
| **Role（1: Main board,0:UI board）** | | | | | | | | | **1:yes ; 0:no** | | | | | | | |

## GET\_TESTCASE\_COUNT

查询FCT测试用例数量，命令包含字段如下：

* Request

向泵端发送一个自定义字段。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0001** | | | | | | | | | | | | | | | | |
| **Role（1: Main board,0:UI board）** | | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0001** | | | | | | | | | | | | | | | | |
| **Role（1: Main board,0:UI board）** | | | | | | | | | **Test Case Count** | | | | | | | |

## GET\_TESTCASE\_ITEM

获取FCT测试用例名称，命令包含字段如下：

* Request

向泵端发送一个自定义字段，包含一个字节的用例索引。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| **Role（1: Main board,0:UI board）** | | | | | | | | | **Test Case Index** | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段，包含测试用例索引，用例名称最大长度，用例名称。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=?** | | | | | | | | | | | | | | | | |
| **Role（1: Main board,0:UI board）** | | | | | | | | | **Test Case Index** | | | | | | | |
| **Test Case Name Length=?** | | | | | | | | | **Case Name** | | | | | | | |
| **Case Name……** | | | | | | | | | **Case Name……** | | | | | | | |

## GET\_TESTCASE\_HINT

获取FCT测试用例提示信息，命令包含字段如下：

* Request

向泵端发送一个自定义字段，包含一个字节的用例索引。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| **Role（1: Main board,0:UI board）** | | | | | | | | | **Test Case Index** | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段，包含测试用例索引，提示信息长度(可变长度)，提示信息。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=?** | | | | | | | | | | | | | | | | |
| **Role（1: Main board,0:UI board）** | | | | | | | | | **Test Case Index** | | | | | | | |
| **Test Case Hint Length=?** | | | | | | | | | **Hint Message** | | | | | | | |
| **Hint Message** | | | | | | | | | **Hint Message...** | | | | | | | |

## TRIGGER\_TESTCASE\_ITEM

执行FCT测试用例，命令包含字段如下：

* Request

向泵端发送一个自定义字段，包含一个字节的Role及一个字节的用例索引。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=0x0002** | | | | | | | | | | | | | | | | |
| **Role（1: Main board,0:UI board）** | | | | | | | | | **Test Case Index** | | | | | | | |

* Response

正常返回：泵端返回一个自定义字段，包含测试用例索引，执行结果，详细信息长度，详细信息（详细信息最大不能超过128字节，不足补0）。

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **0x0001** | | | | | | | | | | | | | | | | |
| **数据长度=?** | | | | | | | | | | | | | | | | |
| **Role（1: Main board,0:UI board）** | | | | | | | | | **Test Case Index** | | | | | | | |
| **Result(0:False 1:True)** | | | | | | | | | **Detail Info Length=?** | | | | | | | |
| **Detail Info** | | | | | | | | | **Detail Info ……** | | | | | | | |

# 附录

## Scale Value

|  |  |
| --- | --- |
| None | 0x00 |
| 10 | 0x01 |
| 100 | 0x02 |
| 1000 | 0x03 |
| 10000 | 0x04 |
| 100000 | 0x05 |

## Infusion Rate Unit

|  |  |
| --- | --- |
| **ug/kg/min** | 0x00 |
| **mg/kg/h** | 0x01 |
| **mL/h** | 0x02 |

## Volume Unit

|  |  |
| --- | --- |
| **mL** | 0x00 |
|  |  |
|  |  |

## Language

|  |  |
| --- | --- |
| **English** | 0x00 |
| **Chinese** | 0x01 |
| **Spanish** | 0x02 |
| **Portuguese** | 0x03 |

## Encode

|  |  |
| --- | --- |
| **ASCII** | 0x00 |
| **UTF-8** | 0x01 |
| **Unicode(16)** | 0x02 |

## Error No

|  |  |  |
| --- | --- | --- |
| 0x00 |  |  |
| 0x01 | 命令未定义 | 产品不支持命令 |
| 0x02 | 命令格式错误 | 命令中包含的字段不完整 |
| 0x03 | 字段参数格式错误 | 字段中参数不符合要求 |
| 0x04 | 包格式错误 | 包的格式不符合要求 |
| 0x05 | 泵端忙 | 正在输注 |
| 0x06 | Flash存储错误 | Flash读写错误 |
| 0x07 | 无效参数 | 传入的参数的值无效 |
| 0x08 | 权限不足 | 没有权限对泵端进行操作 |

## Checksum

从命令体的第一个字节开始至除Checksum自己外的最后一个字节进行CRC校验。

方法如下：

#define CRC32\_SEED 0xFFFFFFFF

static const T\_U32 crc32tab[] = {

0x00000000L, 0x77073096L, 0xee0e612cL, 0x990951baL,

0x076dc419L, 0x706af48fL, 0xe963a535L, 0x9e6495a3L,

0x0edb8832L, 0x79dcb8a4L, 0xe0d5e91eL, 0x97d2d988L,

0x09b64c2bL, 0x7eb17cbdL, 0xe7b82d07L, 0x90bf1d91L,

0x1db71064L, 0x6ab020f2L, 0xf3b97148L, 0x84be41deL,

0x1adad47dL, 0x6ddde4ebL, 0xf4d4b551L, 0x83d385c7L,

0x136c9856L, 0x646ba8c0L, 0xfd62f97aL, 0x8a65c9ecL,

0x14015c4fL, 0x63066cd9L, 0xfa0f3d63L, 0x8d080df5L,

0x3b6e20c8L, 0x4c69105eL, 0xd56041e4L, 0xa2677172L,

0x3c03e4d1L, 0x4b04d447L, 0xd20d85fdL, 0xa50ab56bL,

0x35b5a8faL, 0x42b2986cL, 0xdbbbc9d6L, 0xacbcf940L,

0x32d86ce3L, 0x45df5c75L, 0xdcd60dcfL, 0xabd13d59L,

0x26d930acL, 0x51de003aL, 0xc8d75180L, 0xbfd06116L,

0x21b4f4b5L, 0x56b3c423L, 0xcfba9599L, 0xb8bda50fL,

0x2802b89eL, 0x5f058808L, 0xc60cd9b2L, 0xb10be924L,

0x2f6f7c87L, 0x58684c11L, 0xc1611dabL, 0xb6662d3dL,

0x76dc4190L, 0x01db7106L, 0x98d220bcL, 0xefd5102aL,

0x71b18589L, 0x06b6b51fL, 0x9fbfe4a5L, 0xe8b8d433L,

0x7807c9a2L, 0x0f00f934L, 0x9609a88eL, 0xe10e9818L,

0x7f6a0dbbL, 0x086d3d2dL, 0x91646c97L, 0xe6635c01L,

0x6b6b51f4L, 0x1c6c6162L, 0x856530d8L, 0xf262004eL,

0x6c0695edL, 0x1b01a57bL, 0x8208f4c1L, 0xf50fc457L,

0x65b0d9c6L, 0x12b7e950L, 0x8bbeb8eaL, 0xfcb9887cL,

0x62dd1ddfL, 0x15da2d49L, 0x8cd37cf3L, 0xfbd44c65L,

0x4db26158L, 0x3ab551ceL, 0xa3bc0074L, 0xd4bb30e2L,

0x4adfa541L, 0x3dd895d7L, 0xa4d1c46dL, 0xd3d6f4fbL,

0x4369e96aL, 0x346ed9fcL, 0xad678846L, 0xda60b8d0L,

0x44042d73L, 0x33031de5L, 0xaa0a4c5fL, 0xdd0d7cc9L,

0x5005713cL, 0x270241aaL, 0xbe0b1010L, 0xc90c2086L,

0x5768b525L, 0x206f85b3L, 0xb966d409L, 0xce61e49fL,

0x5edef90eL, 0x29d9c998L, 0xb0d09822L, 0xc7d7a8b4L,

0x59b33d17L, 0x2eb40d81L, 0xb7bd5c3bL, 0xc0ba6cadL,

0xedb88320L, 0x9abfb3b6L, 0x03b6e20cL, 0x74b1d29aL,

0xead54739L, 0x9dd277afL, 0x04db2615L, 0x73dc1683L,

0xe3630b12L, 0x94643b84L, 0x0d6d6a3eL, 0x7a6a5aa8L,

0xe40ecf0bL, 0x9309ff9dL, 0x0a00ae27L, 0x7d079eb1L,

0xf00f9344L, 0x8708a3d2L, 0x1e01f268L, 0x6906c2feL,

0xf762575dL, 0x806567cbL, 0x196c3671L, 0x6e6b06e7L,

0xfed41b76L, 0x89d32be0L, 0x10da7a5aL, 0x67dd4accL,

0xf9b9df6fL, 0x8ebeeff9L, 0x17b7be43L, 0x60b08ed5L,

0xd6d6a3e8L, 0xa1d1937eL, 0x38d8c2c4L, 0x4fdff252L,

0xd1bb67f1L, 0xa6bc5767L, 0x3fb506ddL, 0x48b2364bL,

0xd80d2bdaL, 0xaf0a1b4cL, 0x36034af6L, 0x41047a60L,

0xdf60efc3L, 0xa867df55L, 0x316e8eefL, 0x4669be79L,

0xcb61b38cL, 0xbc66831aL, 0x256fd2a0L, 0x5268e236L,

0xcc0c7795L, 0xbb0b4703L, 0x220216b9L, 0x5505262fL,

0xc5ba3bbeL, 0xb2bd0b28L, 0x2bb45a92L, 0x5cb36a04L,

0xc2d7ffa7L, 0xb5d0cf31L, 0x2cd99e8bL, 0x5bdeae1dL,

0x9b64c2b0L, 0xec63f226L, 0x756aa39cL, 0x026d930aL,

0x9c0906a9L, 0xeb0e363fL, 0x72076785L, 0x05005713L,

0x95bf4a82L, 0xe2b87a14L, 0x7bb12baeL, 0x0cb61b38L,

0x92d28e9bL, 0xe5d5be0dL, 0x7cdcefb7L, 0x0bdbdf21L,

0x86d3d2d4L, 0xf1d4e242L, 0x68ddb3f8L, 0x1fda836eL,

0x81be16cdL, 0xf6b9265bL, 0x6fb077e1L, 0x18b74777L,

0x88085ae6L, 0xff0f6a70L, 0x66063bcaL, 0x11010b5cL,

0x8f659effL, 0xf862ae69L, 0x616bffd3L, 0x166ccf45L,

0xa00ae278L, 0xd70dd2eeL, 0x4e048354L, 0x3903b3c2L,

0xa7672661L, 0xd06016f7L, 0x4969474dL, 0x3e6e77dbL,

0xaed16a4aL, 0xd9d65adcL, 0x40df0b66L, 0x37d83bf0L,

0xa9bcae53L, 0xdebb9ec5L, 0x47b2cf7fL, 0x30b5ffe9L,

0xbdbdf21cL, 0xcabac28aL, 0x53b39330L, 0x24b4a3a6L,

0xbad03605L, 0xcdd70693L, 0x54de5729L, 0x23d967bfL,

0xb3667a2eL, 0xc4614ab8L, 0x5d681b02L, 0x2a6f2b94L,

0xb40bbe37L, 0xc30c8ea1L, 0x5a05df1bL, 0x2d02ef8dL

};

T\_U32 CalcCRC32Partial(const T\_U8 \*bufPtr, T\_S32 size, T\_U32 crc32)

{

T\_S32 i;

for (i = 0; i < size; i++)

{

crc32 = crc32tab[(crc32 ^ bufPtr[i]) & 0xff] ^ (crc32 >> 8);

}

return crc32;

}

## Dose Unit

|  |  |
| --- | --- |
| mcg/kg/h | 0x00 |
| mg/kg/h | 0x01 |
| mcg/kg/min | 0x02 |
| mg/kg/min | 0x03 |

## Weight Unit

|  |  |
| --- | --- |
| kg | 0x00 |
|  | 0x01 |
|  | 0x02 |

## Drug Solution Unit

|  |  |
| --- | --- |
| mg | 0x00 |
|  | 0x01 |
|  | 0x02 |

## File Type

|  |  |  |
| --- | --- | --- |
| **Main Pump firmware** | 0x00 | bootloader |
| **UI Pump firmware** | 0x01 | bootloader |
| **Logo File** | 0x02 | bootloader |
| **Font Lib** | 0x03 | bootloader |

## ­Send File Result

|  |  |
| --- | --- |
| **Fail** | **0x00** |
| **Success** | **0x01** |
| **Cancel** | **0x02** |

## ­Pump Mode

|  |  |
| --- | --- |
| **Normal** | **0x00** |
| **Bootloader** | **0x01** |

## Firmware Type

|  |  |
| --- | --- |
| Main Firmware | **0x00** |
| UI Firmware | **0x01** |
| Main Bootloader | **0x02** |
| UI Bootloader | **0x03** |
| UI Flash Data | **0x04** |
| Main Flash Data | **0x05** |
| Drug Library | **0x06** |
| Main Preset Syringe Data | **0x07** |
| Voice Image | **0x08** |

## Pressure Level

|  |  |
| --- | --- |
| Level1 | 0x00 |
| Level2 | 0x01 |
| Level3 | 0x02 |
| Level4 | 0x03 |
| Level5 | 0x04 |

## Infusion Mode

|  |  |
| --- | --- |
| 速率模式 | 0x00 |
| 时间模式 | 0x01 |
| 体重模式 | 0x02 |
| 多速率模式 | 0x03 |

## Reset Command in SPI Flash

|  |  |
| --- | --- |
| **Reset data** | **Value** |
| Main 压力传感器校准值 | **0x00000001** |
| Main 尺寸传感器校准值 | **0x00000002** |
| Main 近空传感器校准值 | **0x00000004** |
| Main 电池阈值 | **0x00000008** |
| Main 压力校准时10个采集点参考值 | **0x00000010** |
| Main 注射器自校准值 | **0x00000020** |
| Main 注射器预设值 | **0x00000040** |
| Main 5档压力阈值 | **0x00000080** |
| Main ADC补偿值 | **0x00000100** |
| Main 注射器外径值 | **0x00000200** |
| Main自定义压力校准值 | **0x00000400** |
| UI 用户配置数据 | **0x00010000** |
| UI 工厂配置数据 | **0x00020000** |

## Brand

|  |  |
| --- | --- |
| Brand1 | 0x00 |
| Brand2 | 0x01 |
| Brand3 | 0x02 |
| Brand4 | 0x03 |
| Brand5 | 0x04 |
| Brand6 | 0x05 |
| Brand7 | 0x06 |
| Brand8 | 0x07 |
| Brand9 | 0x08 |
| Brand10 | 0x09 |
| Brand11 | 0x0A |
| Brand12 | 0x0B |
| Brand13 | 0x0C |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| CustomBrand1 | 0x80 |
| CustomBrand2 | 0x81 |
| CustomBrand3 | 0x82 |
| CustomBrand4 | 0x83 |
| CustomBrand5 | 0x84 |

## Power Status

|  |  |
| --- | --- |
| External | 0x00 |
| External + Battery | 0x01 |
| Battery | 0x02 |

## Sensor Status

|  |  |
| --- | --- |
| NOT INSTALL | 0x00 |
| INSTALL | 0x01 |

## Battery charge status

|  |  |
| --- | --- |
| Not charging | 0x00 |
| Charging | 0x01 |

## Battery status

|  |  |
| --- | --- |
| Poweroff | 0x00 |
| Deplete | 0x01 |
| Low | 0x02 |
| One | 0x03 |
| Two | 0x04 |
| Three | 0x05 |

## Rate Range

|  |  |
| --- | --- |
| rate\_zero | 0x00 |
| rate\_low | 0x01 |
| rate\_middle | 0x02 |
| rate\_high | 0x03 |

## Sensor Mask

|  |  |
| --- | --- |
| **Sensor** | **Value** |
| **压力传感器** | **0x01** |
| **尺寸传感器** | **0x02** |
|  | **0x04** |
|  | **0x08** |
|  | **0x10** |
|  | **0x20** |
|  | **0x40** |
|  | **0x80** |

## Switch Mask

|  |  |
| --- | --- |
| **Switch** | **Value** |
| **运行时编辑速率** | **0x01** |
| **启动后锁定** | **0x02** |
| **保存最后输注程序** | **0x04** |
| **夜间模式** | **0x08** |
| **品牌自动识别** | **0x10** |
| **药库** | **0x20** |
|  | **0x40** |
|  | **0x80** |

## Switch Status

|  |  |
| --- | --- |
| OFF | 0x00 |
| ON | 0x01 |

## Alarm level

|  |  |
| --- | --- |
| **Alarm level** | **Value** |
| **LEVEL\_NONE** | **0x00** |
| **LEVEL\_ALERT** | **0x01** |
| **LEVEL\_LOWEST** | **0x02** |
| **LEVEL\_LOW** | **0x03** |
| **LEVEL\_HIGH** | **0x04** |
| **LEVEL\_SYS** | **0x05** |
|  |  |
|  |  |

## Alarm ID

|  |  |
| --- | --- |
| **Alarm ID** | **Value** |
| No Alarm | 0x00 |
| Alert Rate out Rang ID | 0x01 |
| Alert Param Not Set ID | 0x02 |
| Alert Rate out Range at Infusion ID | 0x03 |
| Alert Bolus Rate not Set ID | 0x04 |
| Alert Bolus Volume not Set ID | 0x05 |
| Alert Priming Reach Max ID | 0x06 |
| Alert Battery Temp Abnormal ID | 0x07 |
| Alert Multi Rat1 Volume too Small ID | 0x08 |
| Alert Multi Rat2 Volume too Small ID | 0x09 |
| Alert Multi Rat3 Volume too Small ID | 0x0A |
| Alert Syringe size not Cal ID | 0x0B |
| Alert Syringe model Not Exist ID | 0x0C |
| Alert Dose out Of Range ID | 0x0D |
| Alert Concentration Out Of Range ID | 0x0E |
| Alarm Low Battery ID | 0x0F |
| Alarm Forgot Operation ID | 0x10 |
| Alarm Near Complete ID | 0x11 |
| Alarm Battery Depleted ID | 0x12 |
| Alarm Occlusion ID | 0x13 |
| Alarm Completed ID | 0x14 |
| Alarm Syringe clamp Opened ID | 0x15 |
| Alarm Syringe plunger Opened ID | 0x16 |
| Alarm Transmission Error ID | 0x17 |
| Alarm Key Stuck ID | 0x18 |
| Alarm Motor Dir Error ID | 0x19 |
| Alarm Motor Rate Error ID | 0x1A |
| Alarm Motor Driver Error ID | 0x1B |
| Alarm Ext Mem Error ID | 0x1C |
| Alarm Size sensor Fail ID | 0x1D |
| Alarm Pressure sensor Fail ID | 0x1E |
| Alarm Near Empty Sensor Fail ID | 0x1F |
| Alarm Power Off Timeout ID | 0x20 |
| Alarm Heart Beat Lost Err ID | 0x21 |
| Alarm Watch Dog Safety Err ID | 0x22 |
| Alarm Watch Dog MCU Frequency Err ID | 0x23 |
| Alarm Battery Temp Too High ID | 0x24 |
|  | 0x25 |
|  | 0x26 |
|  | 0x27 |
|  | 0x28 |
|  | 0x29 |
|  | 0x2A |
|  | 0x2B |
|  | 0x2C |
|  |  |
|  |  |
|  |  |

## Region

|  |  |
| --- | --- |
| **CHINA\_MAINLAND** | 0x00 |
| **SOUTH\_EAST\_ASIA** | 0x01 |
| **INDIA** | 0x02 |
| **MIDDLE\_EAST\_ASIA** | 0x03 |
| **SOUTH\_AMERICA** | 0x04 |
| **BRAZIL** | 0x05 |

## Drug Item Flag

|  |  |
| --- | --- |
| Deselect | 0x00 |
| Select | 0x01 |

## Import/Export File Type

|  |  |
| --- | --- |
| Main SPI Data | 0x00 |
| UI SPI Data | 0x01 |

## System Status

|  |  |
| --- | --- |
| Wait Power Up | 0x00 |
| Post | 0x01 |
| Stop | 0x02 |
| Pause | 0x03 |
| Run | 0x04 |
| Power Off | 0x05 |