***版本***

***VERSION...........: V14***

***编制***

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概述:本文档规定了PT 1-10KVA UPS RS232C的通信协议。

Genera：This document specifies the RS232C communication protocol of PT 1-10KVA UPS.

硬件描述：

Hardware:

波特率：

BAUD RATE............... : 2400 bps

数据长度：

DATA LENGTH.......... : 8 bits

停止位：

STOP BIT................... : 1 bit

无奇偶校验位：

PARITY...................... : NONE

接口：

CABLING :

上位机/COMPUTER UPS

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接收端RX <------------------------------- TX (pin 2)

发送端TX -------------------------------> RX (pin 3)

接地端GND <-------------------------- GND (pin 5)

上位接线 与UPS接线规则（采用9Pins头母座）

9 pins female D-type connector

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#

# 控制指令Control instructions

## T<cr>电池测试10秒钟

上位机发送Host computer sends：T<cr>

UPS回复UPS ReplyUPS Reply： ACK<cr>

UPS持续电池测试模式 10s 钟测试后返回。如果测试过程中电池电压低，系统立即返回初始状态。

UPS continuous battery test mode returns after 10s test. If the battery voltage is low during the test, the system immediately returns to the initial state.

## TL<cr>电池低压放电测试

上位机发送Host computer sends：TL<cr>

UPS回复UPS Reply： ACK<cr>

系统测试直到电池电压低转市电供电。

The system is tested until the battery voltage is low and the utility power is turned on.

## T<n><cr>电池定时放电测试

上位机发送Host computer sends：T<n><cr>

UPS回复UPS Reply： ACK<cr>

持续电池测试 n 分钟。如果测试过程中电池电压低，系统立即返回；<n>取值 01~99。

Continue battery test for n minutes. If the battery voltage is low during the test, the system returns immediately; <n> takes the value 01~99.

## Q<cr>蜂鸣器开关

上位机发送Host computer sends：Q<cr>

UPS回复UPS Reply：ACK<cr>

交流电压产生故障时，UPS 系统转电池模式并报警，可使用该指令打开或者取消告警音。

When the AC voltage fails, the UPS system switches to battery mode and alarms. You can use this command to turn on or cancel the alarm tone.

## S<n><cr>定时关机

上位机发送Host computer sends：S<n><cr>

UPS回复UPS Reply： ACK<cr>

UPS 输出在<n>分钟后关闭，如果电池电压低，此时系统立即关闭；

The UPS output will shut down after <n> minutes. If the battery voltage is low, the system will shut down immediately;

UPS 系统关闭以后，监控显示系统信息。如果系统恢复，UPS 在 10s 后重新建立连接然后输出；d、 <n>为整型数 .2，.3，…，01，02，…，10

After the UPS system is shut down, the system information is monitored and displayed. If the system recovers, the UPS re-establishes the connection after 10s and outputs it; d, <n> are integers .2, .3, ..., 01, 02, ..., 10

【例如】S.3<cr> 表示系统在 0.3 分钟后关闭输出。

[Example] S.3<cr> means that the system turns off the output after 0.3 minutes.

## S<n>R<m><cr>定时开关机

上位机发送Host computer sends：S<n>R<m><cr>

UPS回复UPS Reply： ACK<cr>

在<n>分钟后关闭 UPS 系统。等待<m>分钟后再开机。

Shut down the UPS system in <n> minutes. Wait for <m> minutes before turning on the computer.

系统关机命令和“定时关机命令”相同。当<m>分钟后，系统等待直到恢复状态； 如果 UPS 处于关闭等待状态，“C”命令可以结束该命令；

如果 UPS 处于恢复等待状态，“C”命令可以使系统输出打开，但是 UPS 必须最少维持 10s 的系统禁止状态；

<n>为.2，.3，…，01，02，…，10；<m>为介于 0001~9999 的数。

The system shutdown command is the same as the "timed shutdown command". After <m> minutes, the system waits until the state is restored; if the UPS is in the shutdown waiting state, the "C" command can end the command;

If the UPS is in the recovery waiting state, the "C" command can turn on the system output, but the UPS must maintain the system disabled state for at least 10s;

<n> is .2, .3, ..., 01, 02, ..., 10; <m> is a number between 0001~9999.

## C<cr>取消定时关机

上位机发送Host computer sends：C<cr>

UPS回复UPS Reply： ACK<cr>

取消“定时关机”和“关机和系统恢复”命令（S<n><cr>和S<n>R<m><cr>指令）。

1. 如果系统正处于关机等待状态，则可取消关机命令；
2. 系统若处于关机后的恢复状态，该命令立即恢复系统输出，但 UPS 必须最少维持 10s 的禁止状态。

Cancel the "Timed Shutdown" and "Shutdown and System Recovery" commands (S<n><cr> and S<n>R<m><cr> instructions).

(1) If the system is in the shutdown waiting state, the shutdown command can be cancelled;

(2) If the system is in the recovery state after shutdown, the command will immediately restore the system output, but the UPS must maintain the disabled state for at least 10 seconds.

## CT<cr>取消电池测试

上位机发送Host computer sends：CT<cr>

UPS回复UPS Reply： ACK<cr>

取消电池测试的状态（TL<cr>和T<n><cr>指令），系统立即恢复为市电模式状态。

Cancel the battery test status (TL<cr> and T<n><cr> instructions), and the system immediately returns to the state of mains mode.

## SON<cr>UPS开机

上位机发送Host computer sends：SON<cr>

UPS回复UPS Reply： ACK<cr>

UPS开机，进入市电模式或者电池模式。Turn on the UPS and enter the mains mode or battery mode.

##  SOFF<cr>UPS关机

上位机发送Host computer sends：SOFF<cr>

UPS回复UPS Reply： ACK<cr>

UPS关机，进入旁路模式或者待机模式。The UPS shuts down and enters bypass mode or standby mode.

# 查询指令Query instruction

## Q1<cr>UPS状态

上位机发送Host computer sends：Q1<cr>

UPS回复UPS Reply：(MMM.M NNN.N PPP.P QQQ RR.R S.SS TT.T b7b6b5b4b3b2b1b0<cr>

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| START | I/P (V) | I/P fault(V) | O/P (V) | O/P (I%) | I/P (Hz) | BattVolt(V) | Temp(°C) | UPS Status | END |
|  |  |  |  |  |  |  |  |  |  |  |
| ( | MMM.M | NNN.N | PPP.P | QQQ | RR.R | S.SS | SS.S | TT.T | Bit7~bit0 | cr |
| 28H |  |  |  |  |  |  |  |  |  | 0DH |

UPS 状态响应信息说明：（数据之间有空格隔开），每部分信息如下：

1. 起始位：“(”
2. 输入电压：“MMM.M”，其中“M”为整型数 0～9；电压的单位为伏特。
3. 输入异常电压：“NNN.N”，其中“N”为整型数 0～9；电压的单位为伏特。
4. 输出电压：“PPP.P”，其中“P”为整型数 0～9；电压的单位为伏特。
5. 输出电流百分比：“QQQ”，值为最大电流百分比，非绝对值。
6. 输入频率：“RR.R”，其中“R”为整型数 0～9；频率的单位为 Hz。
7. 电池电压：“S.SS”，其中“S”为整型数 0～9；电压的单位为伏特。
8. 温度：“TT.T”, 其中“T”为整型数 0～9；单位为摄氏度。

UPS 状态：<U>

<U>是以位的形式表示；如<b7b6b5b4b3b2b1b0>其中 bn 表示 0 或 1；

Explanation of UPS status response information: (There are spaces between data), each part of the information is as follows:

(1) Start bit: "("

(2) Input voltage: "MMM.M", where "M" is an integer of 0-9; the unit of voltage is volts.

(3) Input abnormal voltage: "NNN.N", where "N" is integer number 0～9; the unit of voltage is volt.

(4) Output voltage: "PPP.P", where "P" is an integer of 0-9; the unit of voltage is volts.

(5) Output current percentage: "QQQ", the value is the maximum current percentage, not absolute value.

(6) Input frequency: "RR.R", where "R" is an integer number 0-9; the unit of frequency is Hz.

(7) Battery voltage: "S.SS", where "S" is an integer of 0-9; the unit of voltage is volts.

(8) Temperature: "TT.T", where "T" is the integer 0-9; the unit is Celsius.

UPS status: <U>

<U> is expressed in the form of bits; such as <b7b6b5b4b3b2b1b0> where bn represents 0 or 1;

|  |  |  |
| --- | --- | --- |
| Byte | UPS 状态说明State description | 备注Remarks |
| 7 | 市电故障AC failure | “1”表示市电故障（电池放电）；“0”表示市电正常"1" means the AC failure (battery discharge); "0" means the AC is normal |
| 6 | 电池电压低BAT Low | “1”表示电池电压低 “0”表示电池正常"1" means BAT is low "0" means BAT is normal |
| 5 | 旁路/逆变状态BYPASS/INV | “1”表示旁路状态 “0”表示逆变状态"1" means BYPASS "0" means INV |
| 4 | UPS故障Fault | “1”表示UPS故障 “0”表示正常"1" means Fault "0" means is normal |
| 3 | UPS 类型Type | “1”表示后备机；“0”表示在线机"1" means backup machine; "0" means online machine |
| 2 | 系统测试中System testing | “1”表示测试中"1" means testing |
| 1 | 系统关机System OFF | “1”表示关机激活状态"1" means shutdown activation status |
| 0 | 告警音打开Warning tone on | “1”表示打开告警音 “0”表示关闭告警音"1" means to turn on the warning tone "0" means to turn off the warning tone |

【例如E.g】：PC：Q1<cr>

UPS： (208.4 140.0 208.4 034 59.9 2.05 35.0 00110000<cr>

|  |  |
| --- | --- |
| 输入电压：Input voltage: | 208.4V |
| 输入异常电压：Input abnormal voltage: | 140.0V |
| 输出电压：The output voltage: | 208.4V |
| 输出电流最大百分比：Maximum percentage of output current: | 34% |
| 输入频率：Input frequency: | 59.9Hz |
| 电池(单体)电压：Battery (single) voltage: | 2.05V |
| 温度：temperature: | 35.0 ºC |

UPS 状态为：在线、UPS 故障、旁路供电、非关机状态；

UPS status: online, UPS failure, bypass power supply, non-shutdown status;

##  SVFW<cr>固件版本号查询

查询软件版本号和发行日期。Check the software version number and release date.

上位机发送Host computer sends： SVFW<cr>

UPS回复UPS Reply： (NN.NN (AAAABBCC <cr>

N/A/B/C为数字number 0-9.

【例如】上位机 [Example] Host computer： SVFW<cr>

UPS ：(00.28 (20191101

软件版本为The software version is 00.28，日期为date2019-11-1。

##  GTMP<cr>UPS机内温度查询

上位机发送Host computer sends： GTMP<cr>

UPS回复UPS Reply： (NNN.N MMM.M III.I<cr>

N/M/I为数字number 0-9，单位为Unit is℃

【例如】上位机 [Example] Host computer： GTMP<cr>

UPS ： (023.0 024.0 025.0<cr>

PFC温度为Temperature is23℃，INV温度为Temperature is24℃，环境温度为The ambient temperature is25℃。

##  GBAT<cr>电池查询

上位机发送Host computer sends： GBAT<cr>

UPS回复UPS Reply： (AAA.A BBB.BB CC DD.D EE.E <cr>

所有字母为数字All letters are numbers 0-9.

每部分以空格间隔，响应信息的内容为：Each part is separated by spaces, and the content of the response message is:

1. 起始位Start bit： (
2. 电池电压battery voltage：AAA.A，单位为伏特The unit is volts；
3. 电池放电电流Battery discharge current ：BBB.BB，单位为安培The unit is ampere；
4. 电池节数设定值Battery cell number setting value：CC；
5. 电池放电截止电压设定值Battery discharge cut-off voltage setting value：DD.D，单位为伏特The unit is volts；
6. 电池放电告警电压设定值Battery discharge warning voltage setting value：EE.E，单位为伏特The unit is volts；
7. 结束位End bit：<cr>

【例如】上位机 [Example] Host computer： GBAT<cr>

UPS ： (220.0 100.00 16 10.0 10.5 <cr>

1. 起始位Start bit： (
2. 电池电压battery voltage：220伏特Volts；
3. 电池放电电流Battery discharge current 100安培Ampere；
4. 电池节数设定值Battery cell number setting value：16；
5. 电池放电截止电压设定值Battery discharge cut-off voltage setting value：10伏特Volts；
6. 电池放电告警电压设定值Battery discharge warning voltage setting value：10.5伏特Volts；
7. 结束位End bit：<cr>