salicru

TWIN PRO2 700va - 3Kva COMM PROTOCOL V1.2

Overview

Serial comm protocol used with Twin Pro2 700Va – 3Kva series UPS.

IQ013C01

Document Management.

DOCUMENT HISTORY.

Date	Ver.	Author	Description
26/04/2017	1.0	Carles Marin	First version for Twin Pro2 1-3K comm protocol
28/09/2017	1.1	Carles Marin	Deleted parameters.
15/03/2019	1.2	Carles Marin	Add Alarm Table

IQ013C01

1.- Introduction.

1.1.-   Definitions, Acronyms and Abbreviations.

Term	Description
SLC	SALICRU

IQ013C01

1 Document Description

1.1 Goals

This document specifies the RS232 communication protocol used in TWIN PRO SLC 1-3K UPS. TWIN PRO protocol commands are compatible with SLC TWIN PRO protocol .

1.2 Organization

There are three parts in this manual:

1. SLC Standard Commands
2. ATE and Maintenance Commands
3. Power device commands

1.3 Reference document

《08_TWIN PRO Series UPS Communications Protocol.doc》

1.4 Glossary – Abbreviations – Notations

ECO Mode: High Efficiency Mode, same with HE mode.

CVCF: Converter Mode.

2 Hardware Description

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

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

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

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

Cabling:

```
    COMPUTER              UPS

  =================================

    RX (pin2)   <----------> TX

    TX (pin3)   <-----------> RX

    GND (pin5) <-----------> GND

       (9 pins female D-type connector)
```
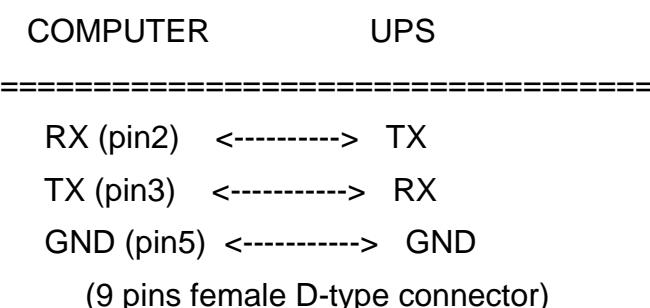
3 SALICRU Standard Commands

These commands in this part are necessary for SALICRU 1/1 UPS, and these commands are used for Winpower or other monitor accessories, eg: NMC card, AS400 Card, CMC Card, Remote Panel, and so on. And these commands can be offered to clients.

3.1 UPS Inquiry Command

3.1.1 Q1<cr>: Status Inquiry 1

Computer: Q1<cr>

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

I/P voltage: MMM.M

> M is an integer number ranging from 0 to 9. The unit is Volt.

I/P fault voltage: NNN.N

> N is an integer number ranging from 0 to 9. The unit is Volt.

O/P voltage: PPP.P

> P is an integer number ranging from 0 to 9. The unit is Volt.

O/P load: QQQ

> QQQ is maximum of W% or VA%. VA% is a percent of maximum VA. W% is a percent of maximum real power.

I/P frequency: RR.R

> R is an integer number ranging from 0 to 9. The unit is Hz.

Battery /cell voltage: SS.S or S.SS

> S is an integer number ranging from 0 to 9. For on-line units battery voltage/cell is provided in the form S.SS. For standby units actual battery voltage is provided in the form SS.S. UPS type in UPS status will determine which reading was obtained.

Ambient Temperature: TT.T

> T is an integer number ranging from 0 to 9. The unit is degree of centigrade.

UPS Status: b7b6b5b4b3b2b1b0

> Where <bn> is a binary number "0" or "1".

UPS status:

Item	Description
b7	1 : Utility Fail (Immediate)
b6	1 : Battery Low
b5	1 : Bypass/Boost Active
b4	1 : UPS Failed

b3	0 : UPS Type is On_ line (1 is Offline)
b2	1 : Test in Progress
b1	1 : Shutdown Active
b0	0 : bat Science

Example:

Computer: Q1<cr>

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

Means:

I/P voltage is 208.4V.   MMM.M

I/P fault voltage is 140.0V.   NNN.N

O/P voltage is 208.4V.   PPP.P

O/P load is 34 %.   QQQ

I/P frequency is 59.9 HZ.   RR.R

Battery single cell voltage is 2.05V.   S.SS

Temperature is 35.0 C degrees. TT.T

-line, UPS failed, Bypass active, and Shutdown not active.

3.1.2 Q4<cr>: Status Inquiry 4

Computer: Q4<cr>

UPS return: (MMM.M HHH.H LLL.L NNN.N PPP.P QQQ DDD RR.R KKK VVV SSS.S TT.T XXXXXXXX<cr>

Input voltage: MMM.M

M is an Integer number 0 to 9. The unit is Volt.

Input maximum voltage: HHH.H

H is an Integer number 0 to 9. The unit is Volt.

Input minimum voltage: LLL.L

L is an Integer number 0 to 9. The unit is Volt.

Input fault voltage: NNN.N

N is an Integer number ranging from 0 to 9. The unit is Volt.

Output voltage: PPP.P

P is an Integer number ranging from 0 to 9. The unit is Volt.

Output current peSLCage: QQQ

QQQ is a perSLC of maximum current, not an absolute value.

Output load peSLCage: DDD

DDD is maximum of W% or VA%.VA% is a percent of maximum VA.W% is a percent of maximum real power.

Input frequency: RR.R

R is an integer ranging from 0 to 9. The unit is Hertz.

Positive BUS voltage: KKK

K is an Integer ranging from 0 to 9. The unit is Volt.

Negative BUS voltage: VVV

V is an Integer ranging from 0 to 9. The unit is Volt.

Battery voltage: SSS.S

S is an Integer ranging from 0 to 9. The unit is Volt.

Ambient Temperature: TT.T

T is an integer ranging from 0 to 9. The unit is °C

Ups status: XXXXXXXX

X: If several status occur at the same time, the X is 1~8 letters adjust, it means:

A: Utility Fail (Line out range)

B: Battery Low

C: Bypass/Boost Active (bypass output now)

D: UPS Failed (fault, bat over, fan fault, charger fail, load fail)

E: Bat test in Progress

F: Shutdown Active

G: SITE fault

H: EPROM fail

I: Test passed – Result: OK

J: Test passed – Result: Failed

K: Test Result: Bat Open

L: Test Status Unknown

M: UPS normal mode

N: UPS overload

P: Bat Open

O~Z are reserved for the future use.

The above status can occur at the same time

Example:

Computer: Q4<cr>

UPS: (220.2 250.5 200.0 136.0 220.2 100 100 50.0 370 375 41.0 45.0 LM<cr>

Means: I/P voltage is 220.2V.

Maximum I/P voltage is 250.5V

Minimum I/P voltage is 200.0V

I/P fault voltage is 136.0V.

O/P voltage is 220.2V.

O/P current is 100%

O/P load 100%

I/P frequency is 50.0 HZ.

Positive BUS voltage is 370V

Negative BUS voltage is 375V

Battery voltage is 41.0V.

Temperature is 45.0 degrees.

Test Status Unknown and UPS status is line mode.

3.1.3 **QF<cr>: Fault Status Inquiry**

Computer: QF<cr>

UPS: (KK PPP FF.F OOO EE.E LLL CCC PPP NNN BB.B TT.T <b7b6b5b4b3b2b1b0><cr>

(a) Start byte: (

(b) Fault kind: KK

K is 2 bytes of ASCII code.

  Definition of the KK fault type: see the ***Alarm Table*

(c) I/P voltage before fault: PPP

P is an integer number ranging from 0 to 9. The unit is Volt.

(d) I/P frequency before fault: FF.F

F is an integer number ranging from 0 to 9. The unit is HZ.

(e) Inverter O/P voltage before fault: OOO

O is an integer number ranging from 0 to 9. The unit is Volt.

(f) Inverter O/P frequency before fault: EE.E

E is an integer number ranging from 0 to 9. The unit is HZ.

(g) O/P load before fault: LLL

LLL is the maximum of W% or VA%.

VA% is a percent of maximum VA.

W% is a percent of maximum real power.

(h) O/P current before fault: CCC

CCC is a percent of maximum current.

(i) Positive Bus voltage before fault: PPP

P is an integer number ranging from 0 to 9. The unit is volt.

(j) Negative Bus voltage before fault: NNN

N is an integer number ranging from 0 to 9. The unit is volt.

(k) Battery voltage before fault: BBB.B

B is an integer number ranging from 0 to 9. The unit is volt.

(l) Temperature before fault: TT.T

T is an integer number ranging from 0 to 9. The unit is C degree.

(m) UPS running status before fault: <b7b6b5b4b3b2b1b0>

<b7b6b5b4b3b2b1b0> is one byte of binary information.

Each bit is transferred into ASCII code. <bn> is a binary number "0" or "1".

Bit	Remarks
7	1:DCTODC on
6	1:PFC on
5	1: INVERTER on
4	Reserved(always 0)
3	1:input relay on
2	1:O/P relay on
1	Reserved(always 0)
0	Reserved(always 0)

This fault data stream will be saved into EEPROM.

Example:

Computer: QF<cr>

UPS: (04 208 41.0 160 50.0 102 100 160 190 041.0 69.0 01101100<cr>

Means: Inverter fault in line mode

I/P voltage is 208V.

I/P frequency is 41.0HZ.

O/P voltage is 160V.

O/P frequency is 50.0HZ

Load is 102%

O/P current is 100%

Positive Bus voltage is 160V

Negative Bus voltage is 190V

Battery voltage is 41.0V.

Temperature is 69.0 ℃

IC3525 off, PFC on, INVERTER on, input relay on, O/P relay on

If there are no UPS fail notes in EEPROM, UPS reply (OK

Example: computer: QF<cr>

　　　UPS: (OK<cr>

*** Alarm Table*

Fault Kind	KK
BUS Over Voltage	21
BUS Under Voltage	22
BUS Short	24
BUS Softstart Fail	25
Output Short Circuit	31
Inv Over Voltage	32
Inv Under Volatge	33
Inv Softstart Fail	34
Inv Cap Open	35
Inv Overload Fault	42
Byp Overload Fault	43
Epo Active	71
Heatsink Over Temperature	81
Inverter Heatsink NTC open	87
Battery Connect Error	1F

3.1.4 QOF<cr>: Inquiry the output frequency

Computer: QOF<cr>

UPS: (FF.F<cr>

Real-time output frequency: FF.F

F is an integer number ranging from 0 to 9. The unit is Hz.

Example:

Computer: QOF<cr>

UPS: (50.5<cr>

3.1.5   **QP<cr>: Control parameters inquiry**

Computer: QP<cr>

UPS: (MM.M NN.N PPP QQQ ExxxDxxxx<cr>

Example:

       Computer: QP<cr>

       UPS: (46.0 54.0 80 264 EpkraDbco<cr>

Means:

        Low detect frequency is 46.0Hz.

        High detect frequency is 54.0Hz.

        Low voltage range on bypass is 80V.

        High voltage range on bypass is 264V.

        Enable bypass audible warning.

        Disable battery mode audible warning.

        Enable key control bypass audible warning.

        Disable key control battery mode audible warning.

        Enable auto-reboot.

        Disable bypass when UPS off.

        Enable audible alarm.

Although the "P" command set one or several parameters, the "QP" command can inquiry all parameters

Example:

       Computer: PG59.9<cr>

       UPS: set high detect frequency to 59.9Hz

       Computer: QP<cr>

       UPS: 46.6 59.9 80 264 EpkraDbco<cr>

3.1.6   **RT<cr>: Model Inquiry**

Computer: RT<cr>

UPS:(VV.VV PP.PP TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT S/S P/P MMM FF.FF RRR BB.B NN WWWWW<cr>

To request setup and type information from the UPS

UPS Firmware Version: VV.VV

       V is an integer number ranging from 0 to 9.

Protocol Number: PP.PP

P is an integer number ranging from 0 to 9.

Current value is 01.00

UPS Name: TTTTTTTTTTTTTTTTTTTTTTTTTTTTTT (30 Char.)

T is an Printable Character

Possible characters :

T10KS,T10K,T6KS,T6K,T3KS,T3K,T2KS,T2K,T1KS,T1K

For TWIN PRO UPS, the ups named as :

TWIN PRO 1-10K Rack UPS : "INNRTxK(S)", x=1, 2, 3,6,10
TWIN PRO 1-10K Tower UPS: "INNTxK(S) ", x=1, 2, 3,6,10
TWIN PRO 10-20K 3/1 Tower UPS : "INN3TxK(S) ", x=10, 15, 20

With "S":   Long back time UPS
Without "S": Standard UPS

For example:
"INNRT6K" means TWIN PRO 6K Rack Standard UPS
"INNT3KS" means TWIN PRO 3K Tower Long backup UPS
"INN3T20KS" means TWIN PRO 20K Tower 3/1Long backup UPS

For TWIN PRO :
Define as KT1KS, KT2KS, KT3KS

Input Source Number/Output Source Number: S/S

S is an integer number of 1 or 2.

Input Phase Number/Output Phase Number: P/P

P is an integer number of 1 or 3.

Nominal Output Voltage: MMM

M is an integer number ranging from 0 to 9. The unit is volt.

Nominal Output Frequency: FF.FF

F is an integer number ranging from 0 to 9. The unit is Hz.

Number of Battery Unit in Series: RRR

R is an integer number ranging from 0 to 9.

Nominal Volatge per Battery Unit: BB.B

B is an integer number ranging from 0 to 9. The unit is volt.

Maximum Number of UPS Module: NN

N is an integer number ranging from 0 to 9.

Rated VA per UPS Module: WWWWW

W is an integer number ranging from 0 to 9. The unit is VA.

For example:

Computer: RT<cr>

UPS: (00.01 01.00 KT10KS 1/1 1/1 220 50.00 020 12.0 04 10000<cr>

3.1.7 **F<cr>: UPS Rating Information**

Computer: F<cr>

UPS: #MMM.M QQQ SS.SS RR.R<cr>

This function makes the UPS answer the rating value of UPS. There should be a space character between every field for separation. The UPS's response contains the following information field:

a. Rating Voltage　　: MMM.M

b. Rating Current　　: QQQ

c. Battery Voltage: SS.SS or SSS.S. For 6KS it is 240V.

d. Frequency　　　　: RR.R

3.1.8 **WM<cr>:　　　UPS mode inquiry**

Computer: WM<cr>

UPS: (T<cr>

T is a number from 0...9

If T=0,then UPS is in Power On mode

If T=1,then UPS is in Standby mode

If T=2,then UPS is in Bypass mode

If T=3,then UPS is in Line mode（in normal state，except Converter/ ECO/ boost/ buck mode）

If T=4,then UPS is in Battery mode

If T=5,then UPS is in Battery Test mode

If T=6,then UPS is in Fault mode

If T=7,then UPS is in Converter mode（for Online UPS

If T=8,then UPS is in ECO mode（for Online UPS）

If T=9,then UPS is in Shut Down mode

If T=A,then UPS is in boost state（for Line-Interactive UPS）

If T=B,then UPS is in buck state（for Line-Interactive UPS）

For T=C~Z, reserved.

<T>	UPS Mode	Note
0	Power On	UPS initial parameters. Without output.

1	No Output	UPS without output and waiting for user to turn on or to bypass. In this mode , PFC and inverter do not work. Charger works if utility is normal.
2	Bypass	Bypass output. Inverter does not work.
3	Line	Inverter output. PFC and inverter works. Output frequency follows bypass if bypass is ok.
4	Battery	Inverter output. DC to DC controller and inverter works. Output frequency follows bypass if bypass is ok. Utility fail.
5	Battery Test	Inverter output. DC to DC controller and inverter works. Output frequency follows bypass if bypass is ok. Utility normal.
6	Fault	UPS turn fault. Output with bypass if fault kind is not 'inverter short circuit'.
7	Converter (CVCF)	Inverter output. PFC and inverter works. Output frequency does not follow bypass but keep 50Hz or 60Hz.
8	ECO(HE)	Bypass output. PFC and inverter works. Output will turn to inverter if bypass loss.
9	Shutdown	UPS is in shutdown mode and shutdown soon

Example:

Computer: WM<cr>

UPS: (3<cr>

Means: UPS works at line mode

IQ013C01

3.1.9 **PI<cr>: To request the Protocol ID from the UPS**

Computer: PI<cr>

UPS: (13<cr>

3.1.10 **MD<cr>: Model Inquiry**

Computer: MD<cr>

UPS: TTTT, WWWW, P/P, MMM, NNN, R, BB.B, AA.A, CC.C<cr>

(a) UPS Model: TTTT
   For example: 10KS

(b) Output rated power: WWWW

   W is an integer number ranging from 0 to 9. The unit is watt.

(c) Input phase/Output phase: P/P

   P is an integer number of 1 or 3.

(d) Nominal I/P Voltage: MMM

   M is an integer number ranging from 0 to 9. The unit is volt.

(e) Nominal O/P Voltage: NNN

   N is an integer number ranging from 0 to 9. The unit is volt.

(f) Cells Number: R

   R is an integer number ranging from 0 to 9.

(g) Battery standard voltage per unit: BB.B

   B is an integer number ranging from 0 to 9. The unit is volt.

(h) Battery start charge voltage per unit: AA.A

   A is an integer number ranging from 0 to 9. The unit is volt.

(i) Battery start discharge voltage per unit: CC.C

   C is an integer number ranging from 0 to 9. The unit is volt

Example:

   Computer: MD<cr>

   UPS: C1k, 700, 1/1, 220, 220, 3, 12.0, 11.5, 13.8<cr>

3.1.11 **V?<cr>: Output voltage inquiry command**

Computer: V?<cr>

UPS: (XXX<cr>

XXX is one of 200/208/220/230/240

3.1.12 **BL?<cr>: Battery level inquiry command**

Computer: BL?<cr>
UPS: XXX<cr>

XXX is from 001 to 999, it shows battery capacity to the user.

3.1.13 **FW?<cr>: Firmware version query**

Computer: FW?
UPS: aaaaa-bbcc
Notes: mainly used for production UPS, eg: 05115-0300

3.1.14 **M<cr>: UPS password**

Computer: M<cr>
UPS: UPS just resend 'C' and 0x0d.

3.1.15 **I<cr>: UPS Information Command**

Computer: I<cr>
UPS: UPS just resend 8 bytes space character and <cr>.

0~8	' '	9	0x0d
Total: 9 bytes			

3.1.16 **EF? <cr>: Inquire frequency range on ECO**

Command: EF?<cr>
Response: (NNN MMM<cr>

Request the ECO mode bypass output frequency range from the UPS

IQ013C01

High bypass frequency limit on ECO mode: NNN

NNN is the bypass high frequency range, range is 5, 6, 7, 8, 9, 10. means 5%, 6%,7%, 8%, 9%, 10%.

Low bypass frequency range on ECO mode: MMM

MMM is the bypass low frequency range, range is 5, 6, 7, 8, 9, 10. means 5%, 6%,7%, 8%, 9%, 10%.

3.1.17 **EV?<cr>: Inquire voltage range on ECO**

Command: EV? <cr>

Response: (PPP QQQ<cr>

Request the ECO mode bypass output voltage range from the UPS

High bypass voltage range on ECO mode: PPP

    PPP is the high bypass voltage range value, range is 5, 6, 7, 8, 9, 10. means 5%, 6%,7%, 8%, 9%, 10%.

Low bypass voltage range on ECO mode: QQQ

    QQQ is the low bypass voltage range value, range is 5, 6, 7, 8, 9, 10. means 5%, 6%,7%, 8%, 9%, 10%.

3.1.18 **FUNC?<cr>: Inquire UPS function status**

Computer: FUNC?<cr>

UPS: <nnnnnnnn><cr>

n is a hex number ranging from.0,1, 2, ...,9 to A,B,C,D,E,F.

<nnnnnnnn> means bit 31 to bit 0 that each bit standing for a function's status, from left to right. 1 means enabling and 0 means disabling.

The mapping relation between functions and bits is as below:

Bit	Control setting
0	Enable/disable ECO mode. Only can be set in Bypass mode or standby mode. If Enable ECO, must disable CVCF
1	Enable/disable Converter(CVCF) mode. Only can be set in Bypass mode or standby mode. If Enable CVCF, must disable ECO
2	Enable/disable Parallel mode. it is always 0 for TWIN PRO2
3	Enable/disable Frequency system auto Detection
4	Enable/disable Auto re-transfer Function

IQ013C01

5	Enable/disable Deep Discharge Function. for TWIN PRO2 UPS after enable, battery shutdown voltage change to Lower Volt(eg: 6V/pcs or 8v/pcs).
6	Enable/disable EPO Function
7	Enable/disable Short-Circuit Clearance Function. It is always 0 for TWIN PRO2
8	Enable/disable Power Segment Function(Only For 1-3K) It is always 0 for TWIN PRO2
9	Enalbe/disable Forbid Bypass
10~31	Reserve

Example:

> Computer: FUNC?<cr>
>
> UPS: 0000000A<cr>
>
> Bit status: 0000 0000 0000 0000 0000 0000 0000 1010 , that is , the value of bit 1 and bit 3 is 1.That means the status of Converter Mode and Frequency System Auto Detection function is enabled.

3.1.19 SASV07 UPS series number inquiry command

Computer: SASV07?<cr>

UPS: GASV07D<nnnnnnnnnnnnnnnnnnnn><cr>

Serial number : nnnnnnnnnnnnnnnnnnnn 20 characters

n: is an Printable Character

3.1.20 BT?<r> To get battery remain time information

PC sends to UPS : BT?<cr>

Response from UPS: (ttttt<cr>.

Function : To get battery remain time information.

Note:

(1) The unit of battery remain time is Second.

(2) t is an integer number ranging from 0 to 9.

(3) If the battery remain time is larger than 99999, then the value should be forced to 99999.

(4) If it is impossible to obtain the battery remain time, respond (----- to the host)

3.2 Control Commands

3.2.1 **T<cr>: 10 seconds test command**

Computer: T<cr>

UPS: Test for 10 seconds and return to utility.

If battery low occur during testing, UPS will return to utility immediately.

3.2.2 **TL<cr>: Test until battery low command**

Computer: TL<cr>

UPS: Test until battery low and return to utility.

3.2.3 **T<n>-Test for specified time command**

Computer: T<n><cr>

UPS: battery test for <n> minutes

<n> is an integer number form 01 to 99.

This command is used to let the user to discharge the battery by setting the time to test, that is to say that the user should discharge the battery by periods, with this command the ups will do it by itself.

3.2.4 **S<n><cr>: Shutdown command**

Computer: S<n><cr>

UPS: Shut UPS output off in <n> minutes.

The UPS output will be off in <n> minutes, even if the utility is present.

But if the battery under occur before <n> minutes, the output is turned off immediately.

After UPS shut down, the controller of UPS monitors the utility. If the utility is there, the UPS will wait for 10 seconds and connect the utility to output.

<n> is a number ranging from.2, .3, ..., 01, 02,..., to 10.

For example: S.3<cr> --- shut out put off in (.3) minutes

3.2.5 **S<n>R<m>-Shutdown and restore command**

Computer :S<n>R<m><cr>

UPS: Shut UPS output off in <n> minutes and waiting for <m> minutes then turn on UPS output again. The shut down sequence is the same as the previous command. When the <m> minutes expired, the utility do not restore, the UPS will wait until utility restore.

If UPS is in shut down waiting status, the "C" command can let the shut down command cancelled. If UPS is in restore waiting status, the "C" command can let the UPS output turned on, but UPS must be hold off at least 10 seconds. (if utility is present)

<n> is a number ranging from .1,.2, .3, ..., 01, 02, ..., to 99.

<m> is a number ranging from 0001 to 9999.

3.2.6 **C<cr>: Cancel shutdown command**

Computer: C<cr>

UPS: Cancel the S<n><cr> and S<n>R<m><cr> command.

If UPS is in waiting shutdown state, the shut down command is cancelled.

If UPS is in waiting restore state, the UPS output is turned on, but UPS must be hold off at least 10 seconds. (If utility is present)

3.2.7 **CT<cr>: Cancel test command**

Computer: CT<cr>

UPS: Cancel all test activity and connect the utility to output immediately.

3.2.8 **EPO<cr>: Emergency Power Off command**

Computer: EPO<cr>

UPS: (EPO <cr>

3.2.9 **SON<cr>: Remote turn on UPS command**

Computer: SON<cr>

UPS: (SON <cr>

Remote turn on UPS.

3.2.10 **SOFF<cr>: Remote turn off UPS command**

Computer: SOFF<cr>
UPS: (SOFF <cr>

Remote turn off UPS.

3.3 Setting parameters Command

3.3.1 **PS<m>G<n>L<p>H<q>E<xxx>D<xxx><cr>: UPS parameters setting**

Computer: PS<m>G<n>L<p>H<q>E<xxx>D<xxx><cr>

UPS:

(a) set low detect frequency on bypass to <m> Hz

　For 50Hz system,<m> is a number ranging from 45.0 to 49.5, default 45.0Hz. The precision is 0.1Hz.

　For 60Hz system,<m> is a number ranging from 45.0 to 59.4, default 54.0Hz. The precision is 0.1Hz.

(b) set high detect frequency on bypass to <n> Hz .

　For 50Hz system,<n> is a number ranging from 50.5 to 70.0, default 55.0Hz. The precision is 0.1Hz

　For 60Hz system,<n> is a number ranging from 60.6 to 70.0, default 66.0Hz. The precision is 0.1Hz

(c) set low voltage range on bypass to <p> volt.

　<p> is a number ranging from 120 to 215, default 176V. The precision is 1volt.

　PS: Can be set in all modes. Take effect immediately.

(d) set high voltage range on bypass to <q> volt.

　<q> is a number ranging from 245 to 300, default 286V. The precision is 1volt.

　PS: Can be set in all modes. Take effect immediately.

 (e) the meaning of "x" is listed in the following table.

　E: means enable, D: means disable

Setting range see the SPEC

Control Setting	X	Default	System Mode	Effect
Bypass Mode Audible Warning	P	Enable	All Mode	Immediately
Battery Mode Audible Warning	B	Enable	All Mode	Immediately
Key Control Bypass Mode Audible Warning	K	Enable	All Mode	Immediately
Key Control Battery Mode Audible Warning	C	Enable	All Mode	Immediately
Auto Reboot	R	Enable	All Mode	Immediately
Auto Bypass When UPS Turn Off	O	Disable	All Mode	Immediately
Audible Alarm	A	Enable	All Mode	Immediately

Example:

Computer: PS45.0G60.0L175H261E<RO>D<A><cr>

UPS:

Set low detect frequency to 45.0Hz.

Set high detect frequency to 60.0Hz.

Set low voltage range on bypass to 175V.

Set high voltage range on bypass to 261V.

Enable bypass output.

Enable auto restart.

Disable audible alarm.

We can only set one parameter as the following:

PS<m><cr>:only set low detect frequency on bypass

PG<n><cr>:only set high detect frequency on bypass

PL<p><cr>:only set low voltage range on bypass

PH<q><cr>:only set high voltage range on bypass

Example:

Computer: PL140<cr>

UPS: set low voltage range on bypass to 140V.

We can set one parameter or several parameters at the same time

Example:

Computer: PS45.0H250<cr>

IQ013C01

UPS:

Set low detect frequency to 45.0Hz.

Set high voltage range on bypass to 250V.

Note: Only in bypass mode and standby mode.

3.3.2   PF<cr>: Set control parameter to default value

Computer: PF<cr>
UPS: ACK<cr>

All UPS parameters set to default value.

Note: Only in bypass mode and standby mode.

3.3.3   CF50<cr>: Set UPS output frequency

Computer: CF50<cr>
UPS: 50.0Hz<cr>

Set UPS output frequency to 50Hz.
Note: Only in bypass mode and standby mode

3.3.4   CF60<cr>: Set UPS output frequency

Computer: CF60<cr>
UPS: 60.0Hz<cr>

Set UPS output frequency to 60Hz.
Note: Only in bypass mode and standby mode
Note: CF50/60<cr>Only can be set in Bypass mode or standby mode.

3.3.5   V<n><cr>: Set Output voltage

Computer: V<n><cr>

UPS: (V<n><cr>

Output Voltage: <n>. n is 200, 208,220,230,240.

Default status: Output voltage 220V.

Note: Only in bypass mode and standby mode

3.3.6   **EF<NNN MMM><cr>: Set frequency range on ECO**

Commands: EF<NNN MMM ><cr>

Action/Response: ACK<cr> / NAK<cr>

NNN is the bypass high frequency range, range is 5, 6, 7, 8, 9, 10. means 5%, 6%,7%, 8%, 9%, 10%,

Default 5%

MMM is the bypass low frequency range, range is 5, 6, 7, 8, 9, 10. means 5%, 6%,7%, 8%, 9%, 10%,

default 5%

UPS responds ACK when accepts this command, otherwise UPS responds NAK.

If ECO mode is enable and bypass output voltage/frequency are in range, then the load power is supplied by bypass output.

Note: Only can be set in NO-ECO mode.

Take effect immediately.

3.3.7   **EV<NNN><MMM><cr>: Set voltage range on ECO**

Commands: EV<NNN MMM><cr>

UPS Action/Response: ACK<cr> / NAK<cr>

<NNN> is the high bypass voltage range value, range is 5, 6, 7, 8, 9, 10. means 5%, 6%,7%, 8%, 9%, 10%., default 5%

<MMM> is the low bypass voltage range value, range is 5, 6, 7, 8, 9, 10. means 5%, 6%,7%, 8%, 9%, 10%, default 5%

UPS responds ACK when accepts this command, otherwise UPS responds NAK.

If ECO mode is enable and bypass output voltage/frequency are in range, then the load power is supplied by bypass output.

Note: Only can be set in NO-ECO mode.

Take effect immediately.

3.3.8 **FUNCE <nnnnnnnn><cr>: Enable UPS Function**

Computer: FUNCE <nnnnnnnn><cr>

UPS: ACK<cr>

n is a hex number ranging from.0, 1,2, ...,9 to A,B,C,D,E,F.

<nnnnnnnn> means bit 31 to bit 0 that each bit standing for a function's enabling, from left to right.

The mapping relation between functions and bits is as below:

Bit	Control setting
0	Enable/disable ECO mode. Only can be set in Bypass mode or standby mode. If Enable ECO, must disable CVCF
1	Enable/disable Converter(CVCF) mode. Only can be set in Bypass mode or standby mode. If Enable CVCF, must disable ECO
2	Enable/disable Parallel mode. it is always 0 for TWIN PRO2
3	Enable/disable Frequency system auto Detection
4	Enable/disable Auto re-transfer Function
5	Enable/disable Deep Discharge Function. for TWIN PRO2 UPS after enable, battery shutdown voltage change to Lower Volt(eg: 6V/pcs or 8v/pcs).
6	Enable/disable EPO Function
7	Enable/disable Short-Circuit Clearance Function. It is always 0 for TWIN PRO2
8	Enable/disable Power Segment Function(Only For 1-3K) It is always 0 for TWIN PRO2
9	Enalbe/disable Forbid Bypass
10~31	Reserve

Example:

Computer: FUNCE 0000000A<cr>

UPS: ACK<cr>

Bit status: 0000 0000 0000 0000 0000 0000 0000 1010 , that is , the value of bit 1 and bit 3 is 1.That means Converter Mode and Frequency System Auto Detection function will be enabled.

Note:"FUNCE" is separated from <nnnnnnnn> by one space key.

3.3.9   **FUNCD <nnnnnnnn><cr>: Disable UPS Function**

Computer: FUNCD <nnnnnnnn><cr>

UPS: ACK<cr>

n is a hex number ranging from.0, 2, ...,9 to A,B,C,D,E,F.

<nnnnnnnn> means bit 31 to bit 0 that each bit standing for a function's disabling, from left to right.

The mapping relation between functions and bits is as below:

Example:

> Computer: FUNCD 0000000A<cr>
>
> UPS: ACK<cr>

Bit status: 0000 0000 0000 0000 0000 0000 0000 1010 , that is , the value of bit 1 and bit 3 is 1.That means Converter Mode and Frequency System Auto Detection function will be disabled.

Note:"FUNCD" is separated from <nnnnnnnn> by one space key.

3.3.10   **SASV07 UPS Series number setting command**

Computer: SASV07D<m...m><cr>

UPS: SASV07<cr>

m...m : the length ≤ 20, can be defined by customer

m: is an Printable Character

For Example:

Setting command:

Computer: SASV07Da12345b67890c<cr>   //the setting length of series number is 13

UPS: SASV07<cr>

Inquiry command:

Computer: SASV07?<cr>

UPS: GASV07Da12345b67890c   <cr> // the length is 20, and there are 7 spaces after 'c'

3.3.11 **SASBXX\<n\>\<cr\>: Bit Function setting command**

Computer: SASBxx\<n\>\<cr\>   n = 0 or 1

UPS: SASBxx\<cr\>

Computer: SASBxx?\<cr\>

UPS: GASBxx\<n\>\<cr\>   n = 0 or 1, the function setting status

XX	Command content	\<n\>	Function	TWIN PRO2 700VA -3KVA
01	Enable/disable Battery discharge time limitation, after enable UPS can stay in battery mode for longest time 999.9h.	0	disable	√
		1	enable	
		?	Query	
02	Enable/disable Code Start	0	disable	√
		1	enable	
		?	Query	
04	Enable/disable Site fault check	0	disable	√
		1	enable	
		?	Query	
06	Enable/disable ambient temperature high alarm	0	disable	√
		1	enable	
		?	Query	
07	Enable/disable overload thrice lock on bypass	0	disable	√
		1	enable	
		?	Query	
09	REPO open/close active	0	EPO Active low(NC)	√
		1	EPO Active High(NO)	
		?	Query	
12	Enable/Disable Fan check	0	Disable	√

		1	enable	
		?	Query	
23	Enable/Disable Battery Open Alarm	0	Disable Battery Open Alarm	√
		1	Enable Battery Open Alarm	
		?	Inquire the status	
24	Enable/disable Frequency system auto Detection	0	Disable	√
		1	enable	
		?	Inquire	
25	EPO check Disable/Enable	0	Disable	√
		1	enable	
		?	Inquire	
27	External Battery Ah Disable/Enable	0	Disable	√
		1	enable	
		?	Inquire	
28	Bat Open Alarm Disable/Enable	0	Disable	√
		1	enable	
		?	Inquire	
29	LCD Idle Disable/Enable	0	Disable	√
		1	enable	
		?	Inquire	

"√"means the UPS support the function

For example Enable/disable Site fault check xx = 04

Computer: SASB040<cr>   // Disable Site fault check

UPS: SASB04<cr>

Computer: SASB04?<cr>   // Inquiry Site fault check

UPS: GASB040<cr>

Computer: SASB051<cr>   // Enable Site fault check

UPS: SASB05<cr>

Computer: SASB05?<cr>   // Inquiry Site fault check

UPS: GASB051<cr>

3.3.12 **SASVXX<n><cr>: Value Function setting command**

Computer: SASVxx<n><cr> or SASVxxD<n><cr>

UPS: SASVxx<cr>

Computer: SASVxx?<cr>

UPS: GASVxx<n><cr> or GASVxxD<n><cr>

Without "D", n uses default Value xxxx, x from 0~9

With "D", n can be redefined, eg as xx.xx, xxxx.x, x.xx, and so on

XX	Command Content	<n>	Function
03	Set external EBM	xxxx: 0000~0020	Setting
		?	Query
05	Set the period battery test time, The precision is a day.	xxxx: 0000 ~ 0031 00: The function disabled	Setting
		?	Query
06D	Set Battery discharge time. The range of the UPS battery discharge time is 14.0~999.9 hours. The default value is 14 hours. The precision is 0.1 hour.	xxx.x: 014.0~999.9	Setting
		?	Query
07D	Setting Serial number	xxxxx…..<cr> (Note:Total xxxx…. numbers should ≤ 20	Setting
		?	Query
10D	Setting UPS Running time	xxxxx…..<cr> (Note:Total10 DDDDHHMMSS DDDD: Running day. From 0000-9999. HH: Runnning hour. from 00 to 23 MM: Running minutes. from 00 to 59. SS: Running seconds. from 00 to 59.	Setting
		?	Query
15	Set Charger current (precision: 0.1A)	Standard Models: :xxxx: 0001 ~0040	setting

		Long backup time models: :xxxx: 0001 ~0120	
		?	inquire
16	Set UPS work mode (Reserved)	xxxx: 0000~0002 0000: Online mode 0001: ECO mode 0002: CVCF mode	setting
		?	inquire
19	External battery Ah (0000~300Ah)	xxxx: 0000~0300	Setting
		?	Inquiry

IQ013C01