ENGINEERING

Modbus Protocol for SPS ADVANCE RT2, V 1.0

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PROTOCOL IN SPS ADVANCE RT2.

1. COMMANDS TABLE.

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21	QBKTM	Autonomy limitation setting inquiry
22	T	10 seconds test
23	TL	Test until battery low
24	T<nn>	Test for specified time
25	S<nn>	Shutdown
26	S<nn>R<mmmm>	Shutdown and restore
27	CS	Cancel shutdown
28	CT	Cancel test
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30	BZON	buzzer beep open
31	SON	Remote turn on UPS
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42	F60	Setting UPS output rating frequency to 60Hz
43	MAXW<nnn>	Setting maximum watt value
44	MAXVA<nnn>	Setting maximum VA value
45	CHGC<nn>	Setting charging current of the charger
46	CHGVB<n.nn>	Setting charging boost voltage of the charger
47	CHGVF<n.nn>	Setting charging float voltage of the charger
48	BATCO<n.nn>	Setting the battery minimum cut-off voltage per cell
49	BATTAH<nnnn>	Setting battery Total AH
50	PST<nn>	Setting the period of period self-test
51	PEPO<n>	Setting EPO terminal logic
52	MD<nnnn>	Setting Autonomy limitation
53	QBATLV<cr>	Battery low voltage inquiry
54	BATLV<n.nn><cr>	Setting the battery low voltage pre alarm
55	BR<cr>	Battery initial information reset

1.1. RULE.

1. Computer and UPS respond both the "<cr>" as the end of a response.
2. UPS respond with "(" start, and with one space separate the data.
3. In a UPS's response, if there is no data, with "-" instead of data, and the length of the "-" as long as data.
4. In a UPS's response, if some data length is less than the definition, type enough "#" before the data.
5. If UPS don't accepts this command, responds (NAK<cr>

1.2. HARDWARE DESCRIPTION.

- BAUD RATE.....: 2400 bps
- DATA LENGTH.....: 8 bits
- STOP BIT.....: 1 bit
- PARITY.....: NONE

COMPUTER		UPS
RX (pin2)	◄——►	TX
TX (pin3)	◄——►	RX
GND (pin5)	◄——►	GND

(9 pins female D-type connector)

1.3. COMMAND.

1. QPI<cr>: Protocol ID Inquiry

   Computer: QPI<cr> UPS: (PI <NN><cr>

   N is an integer number ranging from 0 to 9.

   Function: To request the UPS Protocol ID, Otima is PI00.

2. QMD<cr>: Model Inquiry

   Computer: QMD<cr>

   UPS: (TTTTTTTTTTTTTTT WWWWWWWW KK P/P MMM NNN RR BB.B <cr>

   a. UPS Model: TTTTTTTTTTTTTT
      This whole length is 15bits, if the model value less than 15 bits, please enter "#" before the UPS model instead, for example: #########G10KS.

   b. Output rated VA: WWWWWWWW
      W is an integer number ranging from 0 to 9. The unit is watt.
      The whole length is 7 bits, if the VA value less than 7 bits, please enter "#" before the VA value instead, for example: ##10000.

   c. Output power factor: KK
      K is an integer number ranging from 0 to 9.
      KK is the percentage of power factor, for example: 70

   d. Input phase/Output phase: P/P P is an integer number of 1 or 3.

   e. Nominal I/P Voltage: MMM
      M is an integer number ranging from 0 to 9. The unit is volt.

   f. Nominal O/P Voltage: NNN
      N is an integer number ranging from 0 to 9. The unit is volt.

   g. Battery Piece Number (*): RR
      R is an integer number ranging from 0 to 9.

   h. Battery standard voltage per unit (**): BB.B
      B is an integer number ranging from 0 to 9. The unit is volt.

Note: (*) For Lead-acid battery models, it means number of internal battery. For Li-ion battery models, it means cell number.
(**) For Lead-acid battery models, battery standard voltage is 12V/PC. For Li-ion battery models, battery standard voltage is 3.2V/cell.

	cell number	cell voltage
LiFe-247500	8	3.2V/cell
LiFe-485000	15	
LiFe-722500	24	

For example:
· Computer: QMD<cr>
· UPS: (#########G10KS ##10000 70 1/1 220 220 20 12.0<cr>

3. QMOD<cr>: UPS Mode inquiry

Computer: QMOD<cr> UPS: (M<cr>

Mode	Code(M)
Power on mode	P
Standby mode	S
Bypass mode	Y
Line mode	L
Battery mode	B
Battery test mode	T
Fault mode	F
ECO mode	E
Converter mode	C
Shutdown mode	D

For example:

· Computer: QMOD<cr> UPS: (Y<cr>

Means:

· The current UPS mode is bypass mode.

4. QRI<cr>: UPS Rating Information inquiry

Computer: QRI<cr>

UPS: (MMM.M QQQ SSS.S 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 Output Voltage: MMM.M

b. Rating Output Current: QQQ

c. Battery Voltage: SSS.S.

d. Rating Output Frequency: RR.R.

5. QGS<cr>: The general status parameters inquiry

Computer: QGS<cr>

UPS: (MMM.M HH.H LLL.L NN.N QQQ.Q DDD KKK.K VVV.V SSS.S XXX.X TTT.T

b9b8b7b6b5b4b3b2b1b0<cr>

	Data	Description	Notes
a	(	Start byte	
b	MMM.M	Input voltage	M is an Integer number 0 to 9. The units is V.
c	HH.H	Input frequency	H is an Integer number 0 to 9. The units is Hz.
d	LLL.L	Output voltage	L is an Integer number 0 to 9. The units is V.
e	NN.N	Output frequency	N is an Integer number from 0 to 9. The units is Hz.
g	QQQ.Q	Output current	Q is an Integer number from 0 to 9. The units is A.
h	DDD	Output load percent	For Off-line UPS: DDD is a percent of maximum VA, not an absolute value. For On-line UPS: DDD is Maximum of W% or VA%. VA% is a percent of maximum VA. W% is a percent of maximum real power.

j	KKK.K	Positive BUS voltage	K is an Integer ranging from 0 to 9. The units is V.
k	VVV.V	Negative BUS voltage	V is an Integer ranging from 0 to 9. The units is V.
l	SSS.S	P Battery voltage	S is an Integer ranging from 0 to 9. The units is V.
m	XXX.X	N Battery voltage	X is an Integer ranging from 0 to 9. The units is V.
n	TTT.T	Max Temperature of the detecting pointers	T is an integer ranging from 0 to 9. The units is °C
o	b9b8b7b6 b5b4b3b2 b1b0a0a1	Ups status	B9,b8: 00: standy; 01: line-interactive; 10: on-line. B7: Utility Fail b6: Battery Low b5: Bypass/AVR Active b4: UPS Failed b3: EPO b2: Test in Progress b1: Shutdown Active b0: bat silence a0: Bat test fail a1: Bat test OK

Example:

· Computer: QGS<cr>

· UPS: (220.2 50.0 220.0 50.0 027.0 100 345.8 344.9 241.0 241.5 045.0 100011000000<cr>

Means:

· I/P voltage is 220.2V. I/P frequency is 50.0Hz O/P voltage is 220.0V

· O/P frequency is 50.0Hz. O/P current is 27.0A

· O/P load 100%

· Positive BUS voltage is 345.8V Negative BUS voltage is 344.9V P Battery voltage is 241.0V.

· N Battery voltage is 241.5V.

· Temperature is 45.0 degrees of centigrade.

· On-line mode, Utility OK, Bypass Active, UPS failed.

6. QFLAG<cr>: Setting flag status inquiry

Computer: QFLAG<cr> UPS: (ExxxDxxx <cr>

ExxxDxxx is the flag status. E means enable, D means disable.

x	Control setting
b	Enable/disable battery mode audible warning
r	Enable/disable auto-Restart.
a	Enable/disable audible alarm
s	Enable/disable battery deep discharge protect
g	Enable/disable energy saving
c	Enable/disable cold start
j	Enable/disable Output socket1 when the delay release time is over in battery mode.
l	Enable/disable Site fault detect
m	Set hot standby master/slave, PEM means master, PDM means slave
z	Enable/disable period self test
0	Enable/disable battery disconnect warning

Note: "Battery deep discharge protect" function is not supported for Li-ion models.

7. QWS<cr>: Warning Status Inquiry

Computer: QWS<cr>

UPS: (a0a1……a62a63<cr>

a0,. . .,a63 is the warning status. If the warning is happened, the relevant bit will set 1, else the relevant bit will set 0. The following table is the warning code.

bit	Warning Type
a0	Battery disconnected
a1	
a2	Neutral and line wires oppositely connected
a3	
a4	
a5	
a6	Battery overcharged
a7	Low battery
a8	Overload
a9	
a10	EPO enabled
a11	
a12	Over temperature alarm
a13	Charger alarm
a14	
a15	
a16	
a17	
a18	
a19	
a20	
a21	
a22	
a23	
a24	
a25	
a26	
a27	
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a37	
a38	
a39	
a40	

a41	
a42	
a43	
a44	
a45	
a46	
a47	
a48	
a49	
a50	
a51	
a52	
a53	
a54	P1 cut off pre-alarm
a55	Battery replace alarm
a56	
a57	
a58	
a59	
a60	
a61	EEPROM operation error
a62	
a63	

8. QFS<cr>: Fault Status Inquiry

This command shows the information of the last UPS fault recorded on non-volatile memory.

If UPS never failed:

· Computer: QFS<cr>

UPS: (OK<cr> (no fault)

If there are UPS fail occur:

· Computer: QFS<cr>

· UPS: (KK PPP.P FF.F OOO.O EE.E LLL CCC.C HHH.H NNN.N BBB.B TTT.T <b7b6b5b4b3b2b1b0><cr>

Fault Type	Fault Code	Fault Name
Bus fault	0x01	Bus start fail
	0x02	Bus volt over
	0x03	Bus volt under
Inverter fault	0x11	Inverter soft fail
	0x12	Inverter volt high
	0x13	Inverter volt low
	0x14	L1 inverter short
Electric link fault	0x27	Battery too high
	0x28	Battery too low
Others	0x41	Over temperature
	0x43	Overload fault
	0x45	Charger fail fault

a. Start byte: (

b. Fault kind: KK
K is 2 bytes of ASCII code, define as following:

c. I/P voltage before fault: PPP.P
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
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.C CCC is a percent of maximum current.

i. Positive Bus voltage before fault: HHH.H
P is an integer number ranging from 0 to 9. The unit is volt.

j. Negative Bus voltage before fault: NNN.N
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: TTT.T
T is an integer number ranging from 0 to 9. The unit is degree of centigrade.

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: QFS<cr>

· UPS: (01 208.3 41.0 160.2 50.0 102 027.0 160.0 190.0 041.0 069.0 01101100<cr>

Means:

· Bus start fault.

· I/P voltage is 208.3V.

· I/P frequency is 41.0HZ.

· O/P voltage is 160.2V.

· O/P frequency is 50.0HZ

· Load is 102%

· O/P current is 27.0A

· Positive Bus voltage is 160.0V

· Negative Bus voltage is 190.0V

· Battery voltage is 41.0V.

· Temperature is 69.0 °C

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

9. QVFW<cr> : Main CPU Firmware version inquiry

Computer: QVFW<cr>

UPS: (VERFW:<NNNNN.NN><cr>

Or (VERFW:<NNNNN.NNMM><cr>

<N> is a HEX number from 0...9 or A. . .F.

<M> is char or number.

Example:

· Computer: QVFW<cr>

· UPS: (VERFW:00123.01<cr>

· 00123: firmware series number; 01: version. Computer: QVFW<cr>

· UPS: (VERFW:00123.01s1<cr>

· 00123: firmware series number; 01: version; s1: sub version.

10. QID<cr>: The UPS ID inquiry

Computer: QID<cr>

UPS: (ABCCDDDDEEFFFFFG<cr>

	Data	Description	Notes
a	(	Start byte	
b	A	Main Production type	8: UPS,9: NONE UPS
c	B	Sub Production type	1:AVR UPS, 3: Online UPS
d	CC	VA type	10:1K, 15:1.5K, 20:2K, 30:3K…
e	DDDD	Year	2009, 2010, 2011…
f	EE	Month	01,02…12
g	FFFFF	Serial number	00000~99999
h	G	Manufacturer ID	B:ShenZhen

The ID minimum length is 14 char, maximum length is 16 char.

Example:

· Computer: QID<cr>

· UPS: (811520171100016B <cr>

11. QBV<cr>: The P battery information inquiry

Computer: QBV<cr>

UPS: (RRR.R NN MM CCC TTTTT<cr>

	Data	Description	Notes
a	(	Start byte	
b	RRR.R	Battery voltage	R is an Integer number 0 to 9. The units is V.
c	NN	Battery piece number(*)	NN is from 01 to 24.
d	MM	Battery group number(**)	MM is an Integer number 01 to 99.
e	CCC	Battery capacity	CCC is an Integer number 000 to 100.
f	TTTTT	Battery remain time	T is an Integer number 0 to 9. The units is minutes.

Note: (*) For Lead-acid battery models, it means number of internal battery.
For Li-ion battery models, it means cell number.

	cell number	cell voltage
LiFe-247500	8	3.2V/cell
LiFe-485000	15	
LiFe-722500	24	

(**) The number of batteries in parallel is the number of groups.

12. QSK<n><cr>: Output socket status inquiry

Computer: QSK<n><cr>

<n> is "1"or "2", "1""is refer to output socket1, "2" is refer to output socket2.

UPS: (N<cr>.

The "N" is "0"or "1" , if "N" is "0", the output socket status is OFF; if "N" is "1", the output socket status is ON.

13. QSKT<n><cr>: Output socket release delay time inquiry in battery mode

Computer: QSKT<n><cr>

<n> is "1"or "2", "1""is refer to output socket1, "2" is refer to output socket2.

UPS: (NNN<cr>.

The "NNN" is from"000"to "999", unit is minute.

14. QTPR<cr>: The temperature inquiry

Computer: QTPR<cr>

UPS: (RRR.R SSS.S HHH.H LLL.L<cr>

	Data	Description	Notes
a	(	Start byte	
b	RRR.R	Ambient temperature	R is an Integer number 0 to 9. The units is °C.
c	SSS.S	Inverter heat sink temperature	S is an Integer number 0 to 9. The units is °C.
d	HHH.H	No check point	H is an Integer number 0 to 9. The units is °C.
e	LLL.L	No check point	L is an Integer number 0 to 9. The units is °C.

For example:

Computer: QTPR<cr>

UPS: (032.0 032.4 ---.- ---.-<cr>

Means:

The ambient temperature is 32.0 °C

The inverter heat sink temperature is 32.4 °C;

There is no the third and the fourth temperature check points.

15. QV<cr>: Output voltage setting value inquiry

Computer: QV<cr>

UPS: (V208/220/230/240<cr>

16. QBCO<cr>: Battery cut-off voltage and battery low voltage inquiry

Computer: QBCO<cr>

UPS: (A.AA BB.BB CC.CC<cr>

A.AA: Battery Cut-off minimum voltage per cell,

BB.BB: Cut off voltage per PCS,

CC.CC: Battery low voltage per PCS.

17. QCHGC<cr>: Charging current setting value inquiry

Computer: QCHGC<cr> UPS: (CHGC:<NN><cr> NN: 01/02/04/06/08<cr>

18. QCHGV<cr>: Charging voltage setting value inquiry

Computer: QCHGV<cr> UPS: (A.AA B.BB<cr>

A.AA: Charging boost voltage per cell B.BB: Charging float voltage per cell

19. QBTAH<cr>: The battery Total AH information Inquiry

Computer: QBTAH<cr> Device: (RRR NNNN<cr>

RRR = Three ASCII digits indicating Rating AH, the range is from 001~999, unit: AH

NNNN = four ASCII digits indicating Total AH, the range is from 0001~9999, unit: AH

20. QEPO<cr>: EPO terminal logic definition inquiry

Computer: QEPO<cr>

Device: (n<cr> if device accepts this command. Otherwise, responds (NAK<cr>

n: 0 or 1, 0 means default logic, Plug EPO terminal means EPO not active, unplug EPO terminal means EPO active. 1 means reverse logic, Plug EPO terminal means EPO active, unplug EPO terminal means EPO not active.

Example:

Computer: QEPO<cr>
UPS: (1<cr>

21. QBKTM<cr>: autonomy limitation setting inquiry

Computer: QBKTM<cr>

Device: (nnnn<cr> if device accepts this command. Otherwise, responds (NAK<cr>

<nnnn> is a number ranging from 0000 to 0999 or 9999.

Note:

0000: shut down is after 10 seconds

0001~0999: setting the backup time in minutes from 1-999 for general outlets on battery mode

9999: Disable the autonomy limitation and the backup time will depend on battery capacity.

22. T<cr>: 10 seconds test

Computer: T<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Test for 10 seconds and then return to utility.

(1) If battery low occurs during testing, UPS will return to utility immediately.

(2) Only when UPS is in line mode, the command is executed.

23. TL<cr>: Test until battery low

Computer: TL<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Test until battery low and then return to utility.

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.

Only when UPS is in line mode, and the charger work in float mode, the command is executed.

24. T<nn><cr>: Test for specified time

Computer: T<nn><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

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

Means: Test for <nn> minutes

(1) If battery low occurs during testing, UPS will return to utility immediately.

(2) Only when UPS is in line mode, the command is executed.

25. S<nn><cr>: Shutdown

Computer: S<nn><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Shut UPS output off in <nn> minutes.

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

But if the battery under occur before <nn> 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.

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

For example: S.3<cr> means shut out output in 0.3 minutes

26. S<nn>R<mmmm><cr>: Shutdown and restore

Computer: S<nn>R<mmmm><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Cut UPS output off in <nn> minutes and waiting for <mmmm> minutes and then turn on UPS output again.

The shutdown sequence is the same as the previous command. When the <mmmm> minutes expired, the utility do not restore, the UPS will wait until utility restore.

If UPS is in waiting shutdown status, the "CS" command can let the shutdown command cancelled.

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

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

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

27. CS<cr>: Cancel shutdown

Computer: CS<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Cancel the S<nn><cr> and S<nn>R<mmmm><cr> command.

If UPS is in waiting shutdown state, the shutdown 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)

28. CT<cr>: Cancel test

Computer: CT<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

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

29. BZOFF<cr>: Silence buzzer beep

Computer: BZOFF<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: The buzzer beep silence.

30. BZON<cr>: buzzer beep open

Computer: BZON<cr>
UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: The buzzer beep open

31. SON<cr>: Remote turn on UPS

Computer: SON<cr>
UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Remote turn on UPS.

32. SOFF<cr>: Remote turn off UPS

Computer: SOFF<cr>
UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Remote turn off UPS.

33. SKON<n><cr>: Remote turn off UPS output socket

Computer: SKON<n><cr>
UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Remote turn on UPS output socket.
<n> is "1"or "2", "1""is refer to output socket1, "2" is refer to output socket2,

34. SKOFF<n><cr>: Remote turn off UPS output socket

Computer: SKOFF<n><cr>
UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Means: Remote turn off UPS output socket.
<n> is "1"or "2", "1""is refer to output socket1, "2" is refer to output socket2.

35. PE<XXX>/PD<XXX><cr>: setting some status enable/disable

Computer: PE<XXX>/PD<XXX><cr>
UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

x	Control setting
B	Enable/disable battery mode audible warning
R	Enable/disable auto-reboot.
A	Enable/disable audible alarm
S	Enable/disable battery deep discharge protect
G	Enable/disable energy saving
C	Enable/disable cold start
J	Enable/disable "Output socket1 when the delay release time is over in battery mode" .
L	Enable/disable Site fault detect
M	Set hot standby master/slave, PEM means master, PDM means slave
Z	Enable/disable period self-test
0	Enable/disable battery disconnect warning

Note: "Battery deep discharge protect" function is not supported for Li-ion models.

36. PF<cr>: Setting control parameter to default value

Computer: PF<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> All UPS parameters set to default value.

37. BATGN<nn><cr>: Setting battery group number

Computer: BATGN<nn><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> nn is from 01 to 99

Note: This command is not supported for Li-ion models.

38. PSK<n><mmm><cr>: Set output socket release delay time in battery mode

Computer: PSF<n><m><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> <n> is "1"or "2", "1""is refer to output socket1, "2" is refer to output socket2,.

<mmm> is the output socket release delay time in battery mode, it's from"000"to "999", unit is minute.

39. RESET<cr>: Setting UPS output voltage to default value

Computer: RESET<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

The UPS will be set default output.

For example: Output voltage will be set 230V

40. V<nnn><cr>: Setting output rating voltage

Computer: V<nnn><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> Output voltage: <nnn>, <nnn> is 200, 208, 220, 230, 240.

Default: Output nominal voltage 230V. (It can be set only in standby mode)

For example:

Computer: V230<cr> UPS: (ACK<cr>

Means: Set output nominal voltage to 230V.

41. F50<cr>: Setting UPS output rating frequency to 50Hz

Computer: F50<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> Set UPS output rating frequency to 50Hz. (It can be set only in standby mode)

42. F60<cr>: Setting UPS output rating frequency to 60Hz

Computer: F60<cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> Set UPS output nominal frequency to 60Hz. (It can be set only in standby mode)

43. MAXW<nnn><cr>: Setting maximum watt value

Computer: MAXW<nnn><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> nnn is from 001 to 100.

This command is to change the full load parameter. The parameter is bigger, that is to say the system can load more line load. The default value is 090, and the default PF is 0.9.

44. MAXVA<nnn><cr>: Setting maximum VA value

Computer: MAXVA<nnn><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> nnn is form 001 to 100.

This command is to change the full load parameter. The parameter is bigger, that is to say the system can load more nonlinear load. The default value is 100.

45. CHGC<nn><cr>: Setting charging current of the charger

Computer: CHGC<nn><cr>

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> nn is 01, 02, 04, 06, 08 for long-run model

Note This command is not supported for Li-ion models.

46. CHGVB<n.nn><cr>: Setting charging boost voltage of the charger

Computer: CHGVB<n.nn> <cr>

n.nn= 2.25~2.40, default is 2.36V

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Example:

Computer: CHGVB2.40<cr> UPS: (ACK<cr>

Means: The charging boost voltage is 2.40V/cell.

Note This command is not supported for Li-ion models.

47. CHGVF<n.nn><cr>: Setting charging float voltage of the charger

Computer: CHGVF<n.nn> <cr>

n.nn= 2.20~2.33, default is 2.28V

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Example:

Computer: CHGVF2.25<cr> UPS: (ACK<cr>

Means: The charging float voltage is 2.25V/cell.

Note This command is not supported for Li-ion models.

48. BATCO<n.nn><cr>: Setting the battery minimum cut-off voltage per cell

Computer: BATCO<n.nn> <cr>

n.nn= 1.60~1.83

UPS: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

Example:

Computer: BATCO1.75<cr> UPS: (ACK<cr>

Means: The battery minimum cut-off voltage is 1.75V/cell.

Note This command is not supported for Li-ion models.

49. BATTAH<nnnn><cr>: Setting battery Total AH

Computer: BATTAH<nnnn><cr>

Device: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> nnnn is from 0007 to 9999, unit: AH

For firmware implementing, the battery total AH can be used to calculate the battery group number (=Total AH/Rating AH)

Note This command is not supported for Li-ion models.

50. PST<nn><cr>: Setting the period of period self test

Computer: PST<nn><cr>

Device: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> nn: Period is from 00~99, unit: day, 00: Disable period self test.

51. PEPO<n><cr>: Setting EPO terminal logic

Computer: PEPO<n><cr>

Device: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr> Set the EPO terminal logic (n=0, default; n=1, reversed)

Example:

Computer: PEPO0<cr> UPS: (ACK<cr>

Means: default logic, Plug EPO terminal means EPO not active, unplug EPO terminal means EPO active

Computer: PEPO1<cr> UPS: (ACK<cr>

Means: reverse logic, Plug EPO terminal means EPO active, unplug EPO terminal means EPO not active

52. MD<nnnn><cr>: Setting autonomy limitation

Computer: MD<nnnn><cr>

Device: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

<nnnn> is a number ranging from 0000 to 0999 or 9999.

Note: 0000: shut down is after 10 seconds

0001~0999: setting the backup time in minutes from 1-999 for general outlets on battery mode

9999: Disable the autonomy limitation and the backup time will depend on battery capacity.

53. QBATLV<cr>: Battery low voltage inquiry

Computer: QBATLV<cr>

Device: (n.nn<cr>, Battery low voltage per cell, unit: V.

54. BATLV<n.nn><cr>: Setting the battery low voltage pre alarm

Computer: BATLV<n.nn><cr>

Device: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

<n.nn> is for battery low voltage per cell, a number ranging from 1.80 to 1.88, unit: V, the default is 1.88V.

Note This command is not supported for Li-ion models.

55. BR<cr>: Battery initial information reset

Computer: BR<cr>

Device: (ACK<cr> if UPS accepts this command, otherwise, responds (NAK<cr>

We need use the command to reset battery initial information after the battery is replaced for Li-ion models