

# Inverter Communication Protocol

## REVISION HISTORY

NO	Version	Modification content	Author	Date	Confirmed by	Date
1	01	first draft	Edward	2021-5-11		
2	02	Add relevant settings and status reading of EQ mode	N1RVana	2022-4-13		
3	03	Update GOP, GCHG, GPV and GLNE protocols.	N1RVana	2022-5-27		
4	04	Update TCQ series, LBDT, LVP, Te, par directives and abolish BEQ directives.	N1RVana	2022-6-6		
5	05	Update FAN directives.	N1RVana	2022-6-15		
6	06	Update TEZ directives.	N1RVana	2022-6-21		
7	07	Update TER、TET directives.	N1RVana	2022-7-5		
8	08	Update GOP, GPV and GLINE statistics on power generation and power consumption. Update TIME、DATE directives.  Update GTMP directives.	N1RVana	2022-7-16		
9	09	Update GCHG directives , Compatible with more than 100A charging current.	N1RVana	2022-8-05		
10	10	Update GCC directives , Compatible with more than 100A charging current.	N1RVana	2022-8-09		
11	11	Modify the LWDT directives.	N1RVana	2022-9-14		
12	12	Update SPON、SPOFF、 GPDAT、GPSTS、GPID、 SBAUD directives.	N1RVana	2022-10-08		
13	13	Update GCHG data size	N1RVana	2022-10-10		

14	14	Modify the SVFW directives.	N1RVana	2022-10-10		
15	15	Modify the description of calibration instruction	N1RVana	2022-10-17		

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## 1. Communication protocol and Description

The protocol includes:

- (1) Query Inverter status;
- (2) Provide control command of Inverter;
- (3) Provide inverter parameter setting command;
- (4) All command ends with \r ;
- (5) All commands are sent in ASCII;
- (6) The inverter must respond to the command within 500ms after the upper computer sends the command.

## 2. Hardware description

### 2.1 Transmission mode

- (1) Baud rate: 2400bps
- (2) Data length: 8bits
- (3) Stop bit: 1bit
- (4) No parity bit

### 2.2 Interface: RS232C

Upper computer wiring and Inverter wiring regulation

Upper computer	Inverter	PIN
Receiving End RX	Sending End TX	Pin2
Sending End TX	Receiving End RX	Pin3
GND	GND	Pin5

## 3. Command assignment table

NO	Command	Description	Remark
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Control Command (2)			
1.	SON	Inverter Boot	
2.	SOFF	Inverter Shutdown	
Query Command (16)			
1.	Q1	Inverter status 1	
2.	F	Inverter Rated information	
3.	GMOD	Inverter operating mode	
4.	SVFW	Version No Query	
5.	GTMP	Temperature Query	
6.	GLINE	Mains Query	
7.	GBAT	Battery Query	
8.	GBUS	Bus Query	
9.	GCHG	Charge Query	
10.	GOP	Output Query	
11.	GINV	Inverter Query	
12.	FAN???	Fan Query	
13.	GWS	Faulty alarm Query	
14.	BL	Battery capacity Query	
15.	GPV	PV Query	
16.	TCQN????	Equalizing charging interval timing Query	
17.	DATE????	Date Query	
18.	TIME????	Time Query	
Setting commands (33)			
1.	TE	Making Inverter status setting available	
2.	TD	Making Inverter status setting unavailable	
3.	ED1	Inverter setting restore defaults	
4.	V	Output voltage setting	
5.	F<nn>	System frequency setting	
6.	TBAT	Battery type setting	
7.	CHGC	Charge current setting	
8.	TCCV	Constant voltage charge voltage setting	

9.	TCFV	Float charge voltage setting	
10.	TCQV	Equalizing charging voltage setting	
11.	TCVT	Constant voltage charge time setting	
12.	TCQT	Equalizing charge time setting	
13.	TCQO	Equalizing charge delay setting	
14.	TCQI	Equalizing charge interval setting	
15.	EOD	Battery shutdown point setting	
16.	TBLV	Battery low voltage alarm point setting	
17.	LBDT	Low power discharge time setting	
18.	UP	Output power display setting	
19.	LT	Battery mode wait time setting	
20.	FT	Fan type settings	
21.	HV	Output voltage type setting	
22.	OVP	Mains overvoltage protection	
23.	LVP	Mains undervoltage protection	
24.	CI1	Set the maximum time for constant current charging	
25.	OPR	Output priority setting	
26.	OPM	Output mode setting(app/ups)	
27.	CPR	Charging priority setting	
28.	GCC	Mains charging current setting	
29.	CST	Charging mode setting (automatic selection /2 section /3 section /)	
30.	BTG	The battery voltage setting for switching to line mode setting	
31.	BTB	The battery voltage setting to switch back to battery mode	
32.	BTO	Switching battery overvoltage protection point setting	
33.	PAR	Parallel mode setting	
34.	SBAUD	Baud rate setting	
Calibration command (16)			
1.	BA0	Restore battery voltage calibration defaults	
2.	B1A	High battery voltage calibration	



3.	B2A	Low battery voltage calibration	
4.	PV	PV voltage calibration	
5.	BUN	Bus voltage calibration	
6.	LVR	Line voltage calibration	
7.	VDR	Output voltage calibration	
8.	OCR	Output current calibration	
9.	VR	Inverter voltage calibration	
10.	IR	Inverter current calibration	
11.	DCR	DC voltage components calibration	
12.	CHI	charge current calibration	
13.	LWT	Output 'W' calibration	
14.	LVA	Output 'VA' calibration	
15.	TFA	Output connect transformer no-load voltage	
16.	TFB	Output connect transformer full load voltage	

## **4. Control command**

### **4.1. SON\r**

Upper computer send : SON\r

Inverter response : ACK\r

Inverter boot , enter mains mode or battery mode.

### **4.2. SOFF\r**

Upper computer send : SOFF\r

Inverter response : ACK\r

Inverter shutdown, enter bypass mode or standby mode.

### **4.3. SPON<n>\r**

Upper computer send : SPON<n>\r

Inverter response : ACK\r

The machine number <n> in the parallel system enters the mains mode or battery mode.

### **4.4. SPOFF<n>\r**

Upper computer send : SPOFF<n>\r

Inverter response : ACK\r

The machine numbered <n> in the parallel system enters bypass mode or standby mode.

## 5. Query command

### 5.1. Q1\r

Upper computer send: Q1\r

Inverter response: (MMM.M NNN.N PPP.P QQQ RR.R S.SS TT.T b7b6b5b4b3b2b1b0\r

START	I/P (V)	I/P fault(V)	O/P (V)	O/P (I%)	I/P (Hz)	BattVolt(V)		Temp(°C)	Inverter Status	END
		000.0								
(	MMM.M	NNN.N	PPP.P	QQQ	RR.R	S.SS	SS.S	TT.T	Bit7~bit0	cr
28H										0DH

Inverter status response information description: (there are spaces between the data), and the information of each part is as follows:

- (1) Start bit: “(”
- (2) Input voltage: "MMM. M", where "M" is integer number 0-9; unit of voltage is "V".
- (3) Input exception voltage: "NNN. N", where "N" is integer number 0-9; unit of voltage is "V".
- (4) Output voltage: "PPP. P", where "P" is integer number 0-9; unit of voltage is "V".
- (5) Output current percentage: "QQQ", the value is the maximum current percentage, not absolute value.
- (6) Input frequency: "RR. R", where "R" is integer number 0-9; unit of frequency is ‘Hz’.
- (7) Battery voltage: "S.SS", where "S" is integer number 0-9; unit of voltage is "V".
- (8) Temperature: "TT. T", where "T" is integer number 0-9; unit is centigrade.

Inverter status: <U>

<U>is in the form of bits eg<b7b6b5b4b3b2b1b0> such as bn means 0 or 1;

Byte	Inverter status	Remark
7	mains faulty	“1” means mains faulty ( battery discharge ) ; “0” means mains normal
6	battery voltage low	“1” means battery voltage low “0” means battery normal
5	bypass / Inverter status	“1” means bypass status “0” means Inverter status
4	Inverter faulty	“1” means Inverter faulty “0” means normal
3		0
2		0
1	Remote shutdown status	“1”means shutdown active state “0” means not active



【Eg】 : PC: Q1\r

Inverter: (208.4 000.0 208.4 034 59.9 2.05 35.0 00110000\r

input voltage :	208.4V
input abnormal voltage :	000.0V
output voltage :	208.4V
output current max percentage:	34%
input frequency :	59.9Hz
battery (single cell) voltage :	2.05V
temperature:	35.0 °C

Inverter status is: online ,Inverter faulty 、 bypass 、 non-shutdown status;

## 5.2. F\r

Upper computer send: F\r

Inverter response: #MMM.M QQQ SSS.S RR.R\r

Inverter responds to system rated information, with each value separated by a space. The specific contents are as follows:

- (1) Start bit: #
- (2) Rated voltage: MMM. M, is the integer number 000.0 ~ 999.9, unit is ' V ';
- (3) Rated current: QQQ, integer number 000 ~ 999, unit is ' A ';
- (4) Battery voltage: SS. SS or is SSS. S, which is integer number 00.00-99.99 or 000.0-999.9, unit is ' V ';
- (5) Frequency: RR. R, is the integer number 00.0 ~ 99.9, unit is ' Hz ';
- (6) End bit: \r

## 5.3. GMOD\r

Upper computer send: GMOD\r

Inverter response: (M\r

Mode	Code(M)
Initial Power on mode	P
Standby mode	S
Line mode	L
Battery mode	B
Faulty mode	F
Shutdown mode	D
Testing mode	X

## 5.4. SVFW\r

Query software Version No and issuing date..

Upper computer send: SVFW\r

Inverter response: (N.NNN (AAAABBCC \r  
N/A/B/C is number from 0-9.

【Eg】 upper computer: SVFW\r

Inverter : (4001 (20211105\r

Software version is 4001, date is 2021-11-05.

## 5.5. GTMP\r

Upper computer send: GTMP\r

Inverter response: (NNN.N MMM.M AAA.A III.I ZZZ.Z\r

A/N/M/I/Z is number from 0-9, unit is °C

## 5.6. GLINE\r

Upper computer send: GLINE\r

Inverter response: (AAA.A BB.BB CCC.C DDD.D EEE.E FFF.F GG.GG HH.HH IIII JJJ KKKKK  
LLLLL MMMMM\r

A/B/C/D/E/F/G/H/I/J/K/L/M is number from 0-9.

Each part is separated by spaces, and the content of response information is:

- (1) Start bit: (
- (2) mains input voltage : AAA.A, unit is 'V' ;
- (3) mains frequency : BB.BB, unit is 'Hz' ;
- (4) mains lost voltage high level : CCC.C, unit is 'V' ;
- (5) mains lost voltage low level: DDD.D, unit is 'V' ;
- (6) High response point of mains power loss voltage: EEE.E, unit is 'V' ;
- (7) Low response point of mains power loss voltage: FFF.F, unit is 'V' ;
- (8) mains lost frequency high level: GG.GG, unit is 'Hz' ;
- (9) mains lost frequency low level: HH.HH, unit is 'Hz' ;
- (10) Internal data: IIII
- (11) load percentage: JJJ, unit is '%';
- (12) The total amount of electricity generated on the day : KKKKK,unit is '10W • h';
- (13) Total electricity generation expansion: LLLLL, binary data,need to match the data M
- (14) Total electricity generation : MMMMM, binary data LLLLLMMMMM need to convert to decimal,unit is '10W • h'
- (15) End bit: \r

【Eg】 upper computer: GLINE\r

Inverter : (220.0 50.00 264.0 154.0 255.0 163.0 70.00 40.00 010 \r

- (1) Start bit: (;
- (2) mains input voltage 220V;
- (3) mains frequency 50Hz;
- (4) mains lost voltage high level 264V;
- (5) mains lost voltage low level 154V;
- (6) High response point of mains power loss voltage 255V;
- (7) Low response point of mains power loss voltage 163V;
- (8) mains lost frequency high level 70Hz;
- (9) mains lost frequency low level 40Hz;
- (10) load percentage 10%;
- (11) End bit: \r

## 5.7. GBAT\r

Upper computer send: GBAT\r

Inverter response: (AAA.A BBB.BB CC DD.D EE.E \r

All alphabets are number from 0-9.

Each part is separated by spaces, and the content of response information is:

- (1) Start bit: (
- (2) battery voltage : AAA.A, unit is 'V' ;
- (3) battery discharge current : BBB.BB, unit is A ;
- (4) battery qty setting value : CC;
- (5) battery discharge end voltage setting value : DD.D, unit is 'V' ;
- (6) battery discharge alarm voltage setting value : EE.E, unit is 'V' ;
- (7) End bit: \r

## 5.8. GBUS\r

Upper computer send: GBUS\r

Inverter response: (AAA.A BBB.B CCC.C \r

All alphabets are number from 0-9.

【Eg】 upper computer: GBUS\r

Inverter : ( 361.0 360.0 360.0

Inverter bus voltage is 361V, The initial value of bus reference is set as 360V , bus reference value is set to 360V

## 5.9. GCHG\r

Upper computer send: GCHG\r

Inverter response: (AAA.A BBB.B CC DDD.D EEE.EE FFF.FF GG.G HH.H II.I JJJ.JJ KKKK LLL  
MMM NNN O P Q R SSS.SS TTT.TT UUU.UU VVV.V W\r

All alphabets are number from 0-9.

- (1) Start bit: (
- (2) bus voltage : AAA.A, unit is 'V';
- (3) charge voltage : BBB.B, unit is 'V';
- (4) battery qty : CC;
- (5) charge current: DDD.D, unit is 'A';
- (6) charge current All alphabets are number from 0-9 value (Total charging current) : EEE.EE, unit is 'A'  
;
- (7) Internal data : FFF.FF, unit is 'A';
- (8) constant voltage charge voltage setting value : GG.G, unit is 'V';
- (9) float charge voltage setting value : HH.H, unit is 'V';
- (10) Equalizing charging voltage setting value : II.I, unit is 'V';
- (11) Maximum charging current setting value : JJJ.JJ, unit is 'A'; (PV+AC)
- (12) Constant voltage charging time setting : KKKK, unit is 'minute';
- (13) Equalizing charge time setting : LLL, unit is 'minute';
- (14) Equalizing charge timeout setting value : MMM, unit is 'minute';
- (15) Equalizing charge interval : NNN, unit is 'day';
- (16) Equalizing charge mode : O, 1 is on, 0 is off;
- (17) Battery type setting : P;
- (18) Low power discharge time setting : Q; unit is 'hour';
- (19) Charging mode : R, 0 means stop charging, 1 means constant current mode, 2 means constant voltage mode,  
and 3 means floating charge mode;



- (20) Internal data: SSS.SS;
- (21) Internal data: TTT.TT;
- (22) Internal data: UUU.UU;
- (23) Internal data: VVV.V;
- (24) Internal data: W;
- (25) End bit: \r

## 5.10. GOP\r

Upper computer send: GOP\r

Inverter response: (AAA.A BB.BB CCC.CC DD.DD EEEEE FFFFF GGGGG HHHHH IIII JJJ  
KKKKK LLLLL MMMMM NNNNN OOOOO\r  
A/B/C/D/E/F/G/H/I/J/K/L/M/N/O is number from 0-9.

Each part is separated by spaces, and the content of response information is:

- (1) Start bit: (
- (2) Output voltage : AAA.A, unit is 'V';
- (3) Output frequency : BB.BB, unit is 'Hz';
- (4) Output current : CCC.CC, unit is 'A';
- (5) Output small current : DD.DD, unit is 'A';
- (6) Output active power : EEEEE, unit is 'W';
- (7) Internal data: FFFFF, unit is 'W';
- (8) Output apparent power : GGGGG, unit is 'VA';
- (9) Output small current power : HHHHH, unit is 'W';
- (10) Output half wave apparent power: IIII, unit is 'VA';
- (11) Load percentage : JJJ, unit is '%';
- (12) Internal data: KKKKK;
- (13) Internal data: LLLLL;
- (14) The total output power of the day: MMMMM, unit is 'KW • H';
- (16) Total output power generation expansion: NNNNN, binary data, need to match the data O
- (15) Total output power generation: OOOOO, binary data NNNNNOOOOO need to convert to decimal, unit is '10W • h'
- (16) End bit: \r

## 5.11. GINV\r

Upper computer send: GINV\r

Inverter response: (AAA.A BB.BB CCC.C \r

A/B/C/D/E/F/G is number from 0-9.

Each part is separated by spaces, and the content of response information is:

- (1) Start bit: (
- (2) Inverter voltage : AAA.A, unit is 'V' ;
- (3) Inverter frequency : BB.BB, unit is 'Hz' ;
- (4) Inverter current : CCC.C, unit is A ;
- (5) End bit: \r

## 5.12. FAN???\r

Upper computer send: FAN???\r

Inverter response: (AAA BBB CCCCC D E\r

All alphabets are number from 0-9.

【Eg】 upper computer: FAN???\r

Inverter : (050 00020 00020 0 1\r

- (1) Start bit: (
- (2) fan speed 50%;
- (3) Fan 1 speed detective value;
- (4) Fan 2 speed detective value;
- (5) Fan 1 stop bit, 1 is faulty , 0 is normal ;
- (6) Fan 2 stop bit, 1 is faulty , 0 is normal ;

## 5.13. GWS\r

Upper computer send: GWS\r

Inverter response: (00 0000000000000000 0000000000000000 \r

(NN b15b14b13b12b11b10b9b8b7b6b5b4b3b2b1b0 c15c14c13c12c11c10c9c8c7c6c5c4c3c2c1c0 \r

All alphabets are number from 0-9.

(1) Start bit: (

(2) faulty code: “NN”, machine enter to faulty mode.

faulty code	Meaning
1	bus Boost soft start failure
2	bus over voltage
3	bus under voltage
4	DC-DC abnormal
5	Over temperature
6	Battery overvoltage
7	Bus input boost loss
8	Bus short circuit fault
9	Inverter slow up failed
10	Inverter high voltage
11	Inverter low voltage
12	Inverter short circuit
13	Inverter negative power protection
14	Overload fault
15	Machine model failure
16	No bootstrap
17	Machine burning fault
18	PV overcurrent
19	Same (unique) serial number 【Parallel】
20	Can communication failure 【Parallel】
21	Excessive battery voltage difference 【Parallel】
22	Excessive mains voltage difference 【Parallel】
23	Excessive mains frequency difference 【Parallel】
24	Parallel output setting error

	<b>【Parallel】</b>
25	Out of sync <b>【Parallel】</b>

alarm status 1: <U>, Machine exists alarm status.

<U>is in the form of bits; eg <b15b14b13b12b11b10b9b8b7b6b5b4b3b2b1b0>,such as bn means 0 or 1;

Byte	Inverter alarm description	remark
15	reserve	
14	reserve	
13	EEPROM chip failure	“1” means has, “0” means none
12	reserve	
11	fan faulty	“1” means has, “0” means none
10	reserve	
9	Over heat	“1” means has, “0” means none
8	reserve	
7	Charging high voltage	“1” means has, “0” means none
6	reserve	
5	reserve	
4	reserve	
3	reserve	
2	Charger short circuit	“1” means has, “0” means none
1	Battery not connected	“1” means has, “0” means none
0	Low battery voltage	“1” means has, “0” means none

alarm status 2: <V>, Machine exists alarm status ;

<V>is in the form of bits; eg<c15c14c13c12c11c10c9c8c7c6c5c4c3c2c1c0>such as cn means 0 or 1

Byte	Inverter alarm description	Remark
15	reserve	
14	reserve	
13	reserve	
12	reserve	
11	reserve	

10	reserve	
9	reserve	
8	reserve	
7	reserve	
6	reserve	
5	reserve	
4	Overload	“1” means has, “0” means none
3	reserve	
2	reserve	
1	reserve	
0	reserve	

#### 5.14. BL\r

battery capacity Query

Upper computer send: BL\r

Inverter response: BLAAA\r

AAA is 000~100

#### 5.15. GPV\r

Upper computer send: GPV\r

Inverter response: (AAA.A BBB.B CC.CC DD.DD EEEEE FF G H III.I JJJ.J KKK.K LLL.L MMM.M NN OOOOO PPPP QQQQ QQQQ QQQQ QQQQ RRRRR SSSSS TTTT

b15b14b13b12b11b10b9b8b7b6b5b4b3b2b1b0\r

A/B/C/D/E/F/G/H/I/J/K/L/M/N/O/P/Q/R/S/T is number from 0-9.

Each part is separated by spaces, and the content of response information is :

- (1) Start bit: (
- (2) PV voltage: AAA.A, unit is ‘V’;
- (3) Battery voltage: BBB.B, unit is ‘V’
- (4) PV charging current : CC.CC, unit is ‘A’;
- (5) PV current : DD.DD, unit is ‘A’;
- (6) PV power : EEEEE, unit is ‘W’;

- (7) PV operating mode: FF; 00 is the suspend mode, 01 is the wait mode, 02 is the maintain bus mode, 03 is the tracking mode;
- (8) Internal data: G;
- (9) Internal data: H;
- (10) Internal data: III.I;
- (11) Internal data: JJJ.J;
- (12) Internal data: KKK.K;
- (13) Internal data: LLL.L;
- (14) Internal data: MMM.M
- (15) Internal data: NN;
- (16) Internal data: OOOOO;
- (17) Internal data: PPPPP;
- (18) Internal data: QQQQ QQQQ QQQQ QQQQ;
- (19) Total PV power generation on the day: RRRRR, unit is '10W • h';
- (20) Total PV power generation expansion: SSSSS, binary data, need to match the data T
- (21) Total PV power generation: TTTTT, binary data SSSSTTTTT need to convert to decimal, unit is '10W • h'
- (22) End bit: \r;

alarm status 1: <U>, Machine exists alarm status;

<U> is in the form of bits; eg<b15b14b13b12b11b10b9b8b7b6b5b4b3b2b1b0> bn mean 0 or 1;

Byte	Inverter alarm description	Remark
15	reserve	
14	reserve	
13	reserve	
12	reserve	
11	PV undervoltage	"1" means has, "0" means none
10	Unbalanced charging current	"1" means has, "0" means none
9	Charging current reverse	"1" means has, "0" means none
8	Loss of communication	"1" means has, "0" means none
7	Charging overcurrent	"1" means has, "0" means none
6	Charging channel 1 overcurrent	"1" means has, "0" means none

5	Charging channel 2 overcurrent	“1” means has, “0” means none
4	Channel 1 over temperature alarm	“1” means has, “0” means none
3	Channel 2 over temperature alarm	“1” means has, “0” means none
2	Battery overvoltage	“1” means has, “0” means none
1	Battery undervoltage	“1” means has, “0” means none
0	PV overvoltage	“1” means has, “0” means none

## 5.16.TCQN????\r

The equalizing charge interval timer records the time elapsed since the last equalizing charge.

Upper computer send: TCQN????

Inverter response: AAAA\r

AAAA is 0000~2160, unit is ‘hour’

## 5.17.DATE??????\r

Query or set dates.

Upper computer send: DATE??????\r

Inverter response: AA BB CC\r

AA is 00~99, unit is ‘year’,based on the year 2000,

BB is 01~12, unit is ‘month’

CC is 01~31,unit is ‘day’

Upper computer send: DATE051203

Set the machine date as December 03, 2005

## 5.18.TIME??????\r

Query or set dates.

Upper computer send: TIME??????\r

Inverter response: AA BB CC\r

AA is 00~23, unit is ‘hour’

BB is 00~59, unit is ‘minute’

CC is 00~59,unit is ‘second’

Upper computer send: TIME051203\r

The machine time is set to 5 hours 12 minutes 03 seconds

## 5.19.GPDAT<n>\r

Upper computer send: GPDAT<n>\r

Inverter response: (A B CCCC D EE FFF.F GG.GG HHH.H II.II JJJ.J KK.KK LL.LL MM.M NNN.N  
OOO PPPP QQQQ EEE SSS.S TTT.T UUUU VVV.V\r

A~V is number from 0-9.

Each section is separated by Spaces, for the machine with the number <n> :

- (1) Start bit: (
- (2) Communication failure flag bit: A, 0 is a communication exception and subsequent data is invalid.1 means that the communication is normal and the subsequent data is valid;
- (3) running status: B, 0-PowerOn mode, 1-Shutdown mode, 2-fault mode , 3-Standby mode, 4-Line mode, 5-Battery mode, 6-Test mode.
- (4) software version: CCCC
- (5) Parallel machine mode of operation: D, 0-Stand-alone mode, 1-Single phase parallel machine mode, 2-R phase parallel machine mode, 3-S phase parallel machine mode, 4-T phase parallel machine mode
- (6) fault code: EE,0 is no fault
- (7) inverter voltage: FFF.F, unit is 'V';
- (8) inverter frequency: GG.GG, unit is 'Hz';
- (9) mains voltage: HHH.H, unit is 'V';
- (10) mains frequency: II.II, unit is 'Hz';
- (11) Output voltage: JJJ.J, unit is 'V';
- (12) Output frequency: KK.KK, unit is 'Hz';
- (13) Output current : LL.LL, unit is 'A';
- (14) Battery voltage : MM.M, unit is 'V';
- (15) Battery current : NNN.N, unit is 'A';
- (16) Load percentage : OOO, unit is '%';
- (17) apparent power : PPPP, unit is 'VA';
- (18) active power : QQQQ, unit is 'W';
- (19) battery capacity : RRR, unit is '%';
- (20) PV voltage : SSS.S, unit is 'V';



- (21) PV charging current : TTT.T, unit is 'A';
- (22) PV power : UUUU, unit is 'W';
- (23) board temperature : VVV.V, unit is '°C';
- (23) End bit: \r:

## 5.20.GPSTS<n><m>\r

Upper computer send: GPSTS<n><m>\r

Inverter response: (A b<sub>15</sub>b<sub>14</sub>b<sub>13</sub>b<sub>12</sub>b<sub>11</sub>b<sub>10</sub>b<sub>9</sub>b<sub>8</sub>b<sub>7</sub>b<sub>6</sub>b<sub>5</sub>b<sub>4</sub>b<sub>3</sub>b<sub>2</sub>b<sub>1</sub>b<sub>0</sub> c<sub>15</sub>c<sub>14</sub>c<sub>13</sub>c<sub>12</sub>c<sub>11</sub>c<sub>10</sub>c<sub>9</sub>c<sub>8</sub>c<sub>7</sub>c<sub>6</sub>c<sub>5</sub>c<sub>4</sub>c<sub>3</sub>c<sub>2</sub>c<sub>1</sub>c<sub>0</sub>\r

Each section is separated by Spaces,when <m> is 0,corresponds to the machine number <n>:

- (1) Start bit: (
- (2) Communication failure flag bit: A, 0 is a communication exception and subsequent data is invalid.1 means that the communication is normal and the subsequent data is valid;
- (3) PFC warning message : b<sub>15</sub>b<sub>14</sub>b<sub>13</sub>b<sub>12</sub>b<sub>11</sub>b<sub>10</sub>b<sub>9</sub>b<sub>8</sub>b<sub>7</sub>b<sub>6</sub>b<sub>5</sub>b<sub>4</sub>b<sub>3</sub>b<sub>2</sub>b<sub>1</sub>b<sub>0</sub>

Byte	Inverter alarm description	remarks
15	reserve	
14	Battery under voltage	"1" means yes and "0" means no
13	error of memory	"1" means yes and "0" means no
12	Low power discharge	"1" means yes and "0" means no
11	Fan fault	"1" means yes and "0" means no
10	reserve	
9	over-temperature	"1" means yes and "0" means no
8	reserve	
7	Charging flow	"1" means yes and "0" means no
6	BMS Communication is lost	"1" means yes and "0" means no
5	reserve	
4	Phase sequence errors	"1" means yes and "0" means no
3	reserve	
2	reserve	
1	open circuit voltage	"1" means yes and "0" means no
0	Battery low voltage	"1" means yes and "0" means no

- (4) INV warning message : c<sub>15</sub>c<sub>14</sub>c<sub>13</sub>c<sub>12</sub>c<sub>11</sub>c<sub>10</sub>c<sub>9</sub>c<sub>8</sub>c<sub>7</sub>c<sub>6</sub>c<sub>5</sub>c<sub>4</sub>c<sub>3</sub>c<sub>2</sub>c<sub>1</sub>c<sub>0</sub>

Byte	Inverter alarm description	remarks
15	Parallel machine setting error	"1" means yes and "0" means no
14	Parallel machine synchronization failure	"1" means yes and "0" means no
13	Parallel machine communication failure	"1" means yes and "0" means no
12	parallel machine version is not compatible	"1" means yes and "0" means no
11	reserve	
10	reserve	
9	reserve	
8	Parallel machine is out of phase	"1" means yes and "0" means no
7	reserve	"1" means yes and "0" means no
6	PVunderpower	"1" means yes and "0" means no
5	reserve	
4	Overload	"1" means yes and "0" means no
3	reserve	
2	reserve	
1	Mains frequency loss	"1" means yes and "0" means no
0	Mains voltage loss	"1" means yes and "0" means no

(5) End bit: \r:

Each section is separated by Spaces,when <m> is 1,corresponds to the machine number <n>:

- (1) Start bit: (
- (2) Communication failure flag bit: A, 0 is a communication exception and subsequent data is invalid.1 means that the communication is normal and the subsequent data is valid;
- (3) Mains warning message :  $b_{15}b_{14}b_{13}b_{12}b_{11}b_{10}b_9b_8b_7b_6b_5b_4b_3b_2b_1b_0$

Byte	Inverter alarm description	remarks
15	reserve	
14	reserve	
13	reserve	
12	reserve	

11	internal data	"1" means yes and "0" means no
10	internal data	"1" means yes and "0" means no
9	internal data	"1" means yes and "0" means no
8	Mains power loss (generator)	"1" means yes and "0" means no
7	internal data	"1" means yes and "0" means no
6	internal data	"1" means yes and "0" means no
5	internal data	"1" means yes and "0" means no
4	internal data	"1" means yes and "0" means no
3	Mains is normal	"1" means yes and "0" means no
2	Mains waveform is lost	"1" means yes and "0" means no
1	Mains frequency is lost	"1" means yes and "0" means no
0	Mains voltage is lost	"1" means yes and "0" means no

(4) Charge warning message : c15c14c13c12c11c10c9c8c7c6c5c4c3c2c1c0

Byte	Inverter alarm description	remarks
15	reserve	
14	reserve	
13	reserve	
12	reserve	
11	reserve	"1" means yes and "0" means no
10	reserve	"1" means yes and "0" means no
9	reserve	"1" means yes and "0" means no
8	reserve	"1" means yes and "0" means no
7	reserve	"1" means yes and "0" means no
6	internal data	"1" means yes and "0" means no
5	internal data	"1" means yes and "0" means no
4	internal data	"1" means yes and "0" means no
3 ~ 1	DCDC state	"0" means standby, "1" means charge, and "2" means discharge
0	PV allow charge	"1" means yes and "0" means no

(5) 结束位: \r

## 5.21.GPID<n>\r

Upper computer send: GPID<n>\r

Inverter response: (A BBBBB CCCCC DDDDD\r

A/B/C/D is number from 0-9.

Each section is separated by Spaces,corresponds to the machine number <n>:

- (1) Start bit: (
- (2) Communication failure flag bit: A, 0 is a communication exception and subsequent data is invalid.1 means that the communication is normal and the subsequent data is valid;ID1 位: BBBBB;
- (3) ID1: BBBBB;
- (4) ID2: CCCCC;
- (5) ID3: DDDDD;
- (6) 结束位: \r

## 6. Setting commands

### 6.1. TE<n>\r

Upper computer send: TE<n>\r

Inverter response: ACK\r

Inverter response ACK then setting successfully, response NAK then setting failure.

<n>'s content is as below.

n	Meaning	default
A	LCD returns to the default page after no operation timeout.	enable
B	mains over voltage fast protection (mains high voltage 1 low frequency cycle time telling lost )	disability
C	Automatic restart 3 times after overload fault	disability
D	Automatic restart for 3 times after over temperature fault	disability
E	Buzzer alarm after photovoltaic / mains power loss	enable

<b>F</b>	( reserve )	
<b>G</b>	Switch to mains power after the battery mode is overloaded (if the mains power is normal)	enable
<b>H</b>	Frequency adaptation function	enable
<b>I</b>	Battery saving mode	disability
<b>J</b>	( reserve )	
<b>K</b>	charger allow	enable
<b>L</b>	Battery missed alarm	disability
<b>M</b>	Zero crossing phase locking	enable
<b>N</b>	Immediate equalizing charge (after entering the float mode next time)	disability
<b>O</b>	Buzzer mute	disability
<b>P</b>	( reserve )	
<b>Q</b>	Battery equalization mode	disability
<b>R</b>	( reserve )	
<b>S</b>	( reserve )	
<b>T</b>	( reserve )	
<b>U</b>	( reserve )	
<b>V</b>	( reserve )	
<b>W</b>	( reserve )	
<b>X</b>	( reserve )	
<b>Y</b>	Inverter soft start and close Relay	disability
<b>Z</b>	( reserve )	

Query setting:

Upper computer send: TE?\r

Inverter response: (nnnn\r

<n>'s content as above table.

## 6.2. TD<n>\r

Upper computer send: TD<n>\r

Inverter response: ACK\r

<n>Refer to the table in TE<n>\r command.

Inverter response ACK then setting successfully, response NAK then setting failure.

Query setting:

Upper computer send: TD?\r

Inverter response: (nnnn\r

<n>Refer to the table in TE<n>\r command.

### 6.3. ED1\r

Upper computer send: ED1\r

Inverter response: ACK\r

Inverter response ACK then setting successfully, response NAK then setting failure.

All of the Inverter setting reset to defaults.

Note: the inverter can only be set in standby mode or mains power output mode.

### 6.4. V<nnn>\r

setting range	nnn is from 100、110、115、120、127、208、220、230、240. (1) 100、110、115、120、127 setting only used on LCD displayed the converted voltage
default	220
example	upper computer: V120\r Inverter : ACK\r Inverter set to display the output voltage of 120V after connect with transforme.(only HV command can be set, for details 6.18)  upper computer: V220\r Inverter : ACK\r Inverter set the actual output voltage of inverter to 220V.  Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	V???\r Inverter response: (220 120\r 220 is the true output voltage of the inverter, and 120 is the display output voltage after the transformer is connected.

### 6.5. F<nn>\r

setting range	nn is 50 or 60, unit is Hz
default	50

example	<p>upper computer: F50\r</p> <p>Inverter : ACK\r</p> <p>Inverter setting system frequency is 50Hz.</p> <p>Inverter response ACK then setting successfully, response NAK then setting failure.</p> <p>Note: the inverter can only be set in standby mode or mains power output mode</p>
Query setting	Please refer to F\r command

## 6.6. TBAT<n>\r

setting range	<p>n range is 0/1/2/3,</p> <p><b>0</b> refers to acid battery (14.1v/ cell for constant voltage charging and 13.5v/ cell for floating charging);</p> <p><b>1</b> refers to flooded battery (14.6v/ cell for constant voltage charging and 13.5v/ cell for floating charging);</p> <p><b>2</b> is lithium battery;</p> <p><b>3</b> is the user-defined mode, and the charging voltage can be modified by tccv and tcfv commands;;</p>
default	0
example	<p>upper computer: TBAT0\r</p> <p>Inverter : ACK\r</p> <p>Inverter set battery to acid type.</p> <p>Inverter response ACK then setting successfully, response NAK then setting failure.</p>
Query setting	<p>Upper computer send: TBAT?\r</p> <p>Inverter response: (0\r</p>

## 6.7. CHGC<nnn>\r

setting range	nnn is range from 010-120, unit is A, (The PV charger of PWM type is 010-110A)
default	1
example	<p>upper computer: CHGC020\r</p> <p>Inverter : ACK\r</p> <p>Inverter is set the battery charging current to 20A.</p> <p>Inverter response ACK then setting successfully, response NAK then setting</p>

	failure.
Query setting	Upper computer send: CHGC??? Inverter response: (020

## 6.8. TCCV<nn.n>

setting range	<p>The scope of 'nn.n' as follows,</p> <p>12V battery input: 12.0~15.5V;</p> <p>24V battery input: 28.0~29.0V;</p> <p>48V battery input: 48.0~62.0V;</p> <p>This command takes effect when the battery type is set to custom (CUS) (send tbat2 command)</p>
default	<p>12V battery input: 14.1V;</p> <p>24V battery input: 28.2V;</p> <p>48V battery input: 56.4V;</p>
example	<p>upper computer: TCCV28.3</p> <p>Inverter : ACK</p> <p>Inverter is set the constant voltage charging voltage of the battery to 28.3V.</p> <p>Inverter response ACK then setting successfully, response NAK then setting failure.</p> <p>Note: the set point of constant voltage charging voltage shall be greater than the set point of floating charge voltage.</p>
Query setting	<p>Upper computer send: TCCV??? Inverter response: (28.3</p>

## 6.9. TCFV<nn.n>

setting range	<p>The scope of 'nn.n' as follows,</p> <p>12V battery input: 12.0~15.5V;</p> <p>24V battery input: 26.6~27.8V;</p> <p>48V battery input: 48.0~62.0V;</p> <p>This command takes effect when the battery type is set to custom (CUS) (send tbat2 command)</p>
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default	12V battery input: 13.5V; 24V battery input: 27.0V; 48V battery input: 54.0V;
example	upper computer: TCFV27.2\r Inverter : ACK\r Inverter is set the battery floating charge voltage to 27.2V. Inverter response ACK then setting successfully, response NAK then setting failure. Note: the set point of floating charge voltage shall be less than the set point of constant voltage charge voltage.
Query setting	upper computer: TCFV????\r Inverter response: (27.2\r

## 6.10.TCQV<nn.n>\r

setting range	After the battery equalization mode is turned on, the battery will be continuously charged at the equalization voltage for a period of time at the set time interval. Equalizing charging voltage setting value nn n. The scope is as follows: 12V battery input: 12.0~15.0V; 24V battery input: 24.0~30.0V; 48V battery input: 48.0~60.0V;
default	12V battery input: 14.6V; 24V battery input: 29.2V; 48V battery input: 58.4V;
example	upper computer: BEQ25.0\r Inverter : ACK\r Inverter is set the battery voltage to return to mains mode as 25V. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: BTG????\r Inverter response: (25.0\r

## 6.11.TC VT<nnnn>\r

setting range	The range of nnnn is 0001~0720 minutes. When the charging mode is selected as fixed 3-stage mode, it is valid (send cst02\r command)
default	0000
example	upper computer: TC VT0720\r Inverter : ACK\r Inverter is set the constant voltage charging time of the battery as minute. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: TC VT????\r Inverter response: (0720\r

## 6.12.TC QT<nnnn>\r

setting range	nnnn is range from 0005~0900 minute
default	0030
example	upper computer: TC QT0060\r Inverter : ACK\r Inverter is set equalizing charge time as 60 minute. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: TC QT????\r Inverter response: (0030\r

## 6.13.TC QO<nnnn>\r

setting range	nnnn is range from 0005~0900 minute
default	0060
example	upper computer: TC QO0120\r Inverter : ACK\r Inverter is set equalizing charge delay as 120 minute. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: TC QT????\r Inverter response: (0060\r

## 6.14. TCQI<nnnn>\r

setting range	nnnn is range from 0024~2160 hour
default	0720
example	upper computer: TCQO1440\r Inverter : ACK\r Inverter is set equalizing charge interval as 1440 hour (60 day) . Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: TCQO????\r Inverter response: (0720\r

## 6.15. EOD<nn.n>\r

setting range	The scope of 'nn.n' as follows, 12V battery input: 10.0~12.0V; 24V battery input: 20.0~22.0V; 48V battery input: 40.0~48.0V; This command takes effect when the battery type is set to custom (send tbat2\r command)
default	12V battery input: 10.5V; 24V battery input: 21.0V; 48V battery input: 42.0V;
example	upper computer: EOD21.0\r Inverter : ACK\r Inverter is set battery low voltage shutdown point as 21.0V. Inverter response ACK then setting successfully, response NAK then setting failure. This command takes effect when the battery type is set to custom (send tbat2\r command)
Query setting	Upper computer send: EOD????\r Inverter response: (21.0\r

## 6.16. TBLV<nn.n>\r

setting range	<p>The scope of 'nn.n' as follows,</p> <p>12V battery input: 10.5~13.5V;</p> <p>24V battery input: 20.6~22.6V;</p> <p>48V battery input: 42.0~54.0V;</p> <p>This command takes effect when the battery type is set to custom (send tbat2\r command)</p>
default	<p>12V battery input: 11.0V;</p> <p>24V battery input: 22.0V;</p> <p>48V battery input: 44.0V;</p>
example	<p>upper computer: TBLV21.0\r</p> <p>Inverter : ACK\r</p> <p>Inverter is set battery low voltage alarm point as 21V.</p> <p>Inverter response ACK then setting successfully, response NAK then setting failure.</p>
Query setting	<p>Upper computer send: TBLV????\r</p> <p>Inverter response: (21.0\r</p>

## 6.17. LWDT<nnnn>\r

setting range	<p>nnnn is range from 60~480</p> <p>The instruction takes effect immediately, and the setting value only takes effect in app mode.</p>
default	480
example	<p>upper computer: LWDT0240\r</p> <p>Inverter : ACK\r</p> <p>Inverter is set low power discharge time as 4 hour (240 minute) .</p> <p>Inverter response ACK then setting successfully, response NAK then setting failure.</p>
Query setting	<p>Upper computer send: LWDT????\r</p> <p>Inverter response: (0480\r</p>

## 6.18. UP<nnnn>\r

setting range	nnnn is range from 1~05000, unit is VA
default	0
example	upper computer: UP05000\r Inverter : ACK\r Inverter is set the virtual display power as 5KVA. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: UP?????\r Inverter response: (05000\r

## 6.19. LT<nn>\r

setting range	nn is range from 1~300, unit is s
default	5
example	upper computer: LT010\r Inverter : ACK\r Inverter is set waiting time for battery mode to return to mains mode as 10s. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: LT???\r Inverter response: (010\r

## 6.20. FT<n>\r

setting range	n is 0 (Allow fan fault detection) or 1 (Disable fan fault detection)
default	0
example	upper computer: FT1\r Inverter : ACK\r Inverter setting prohibits fan fault detection. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: FT?\r Inverter response: (1\r

## 6.21.HV<n>\r

setting range	n is 0 (Output high voltage ) or 1 (Output low voltage)
default	0
example	upper computer: HV1\r Inverter : ACK\r Inverter setting output is connected to transformer step-down output. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: HV?\r Inverter response: (1\r

## 6.22.OVP<nnn>\r

setting range	nnn is range from 264~280, unit is V
default	264
example	upper computer: OVP280\r Inverter : ACK\r Inverter sets the input voltage overvoltage fast protection (1 power frequency cycle) point to 280V. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: OVP???\r Inverter response: (280\r

## 6.23.LVP<nnn>\r

setting range	APP mode : nnn is range from 090~154, unit is V UPS mode : nnn is range from 170~200, unit is V
default	APP mode : 154V, UPS mode : 185V
example	upper computer: LVP090\r Inverter : ACK\r Inverter sets the input voltage overvoltage fast protection (1 power frequency

	cycle) point to 90v. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: LVP???\r Inverter response: (154\r

## 6.24.CI1<nn>\r

setting range	nn is range from 01~99, unit is 'hour'
default	12
example	upper computer: CI110\r Inverter : ACK\r Inverter sets the maximum time for constant current charging to 10 hours. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: CI1??\r Inverter response: (10\r

## 6.25.OPR<nn>\r

setting range	Set the output priority, nn is range from 00/01/02; 00: mains power output is preferred; 01: PV output is preferred; 02: priority from high to low, PV - > battery - > mains power
default	00
example	upper computer: OPR01\r Inverter : ACK\r Inverter sets PV output priority. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: OPR??\r Inverter response: (01\r

## 6.26.OPM<nn>\r

setting range	<p>Set the output mode, nn ranges from 00/01</p> <p>00: Home appliance model, Mains mode to battery mode switching time is typically 10ms.</p> <p>01: UPS mode, Mains mode to battery mode switching time is typically 10ms.</p>
default	00
example	<p>upper computer: OPM01\r</p> <p>Inverter : ACK\r</p> <p>Inverter sets output mode to UPS mode.</p> <p>Inverter response ACK then setting successfully, response NAK then setting failure.</p>
Query setting	<p>Upper computer send: OPM??\r</p> <p>Inverter response: (01\r</p>

## 6.27.CPR<nn>\r

setting range	<p>Set charging priority,nn ranges from 00/01/02/03</p> <p>00: Mains charging is preferred;</p> <p>01: PV charging is preferred;</p> <p>02: The mains and PV are charged together;</p> <p>03: Only PV charging is allowed</p>
default	02
example	<p>upper computer: CPR01\r</p> <p>Inverter : ACK\r</p> <p>Inverter sets PV charging priority.</p> <p>Inverter response ACK then setting successfully, response NAK then setting failure.</p>
Query setting	<p>Upper computer send: CPR??\r</p> <p>Inverter response: (01\r</p>



## 6.28.GCC<nn>\r

setting range	Set the maximum charging current of the mains,nn ranges from1~60, the unit is A;
default	30
example	upper computer: GCC50\r Inverter : ACK\r Inverter sets the maximum mains charging current to 50A. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: GCC??\r Inverter response: (50\r

## 6.29.CST<nn>\r

setting range	Set charging mode,nn ranges from00/01/02 00: Automatic mode,Before charging, the battery voltage is lower than 12.5V/ section for Three-stage charging, otherwise it is Two-stage charging; 01: Forced charging for Three-stage charging; 02: Forced charging for Two-stage charging;
default	00
example	upper computer: CST01\r Inverter : ACK\r Inverter sets the charging mode to mandatory two-stage mode. Inverter response ACK then setting successfully, response NAK then setting failure. Note: If it is set to 00, that is, automatic decision mode, the maximum charging time of constant voltage is set to 8 hours at the same time.
Query setting	Upper computer send: CST??\r Inverter response: (01\r

## 6.30.BTG<nn.n>\r

setting range	When the OPR instruction sets the priority of output non-mains power,
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	<p>if the pv energy is insufficient, the battery power will continue to be released. This instruction can be used to determine the voltage and return to mains mode after reaching a certain level to save a certain battery power. The range of nn. n is as follows:</p> <p>12V battery input: 11.0~13.0V;  24V battery input: 22.0~26.0V;  48V battery input: 44.0~52.0V;</p>
default	<p>12V battery input: 11.5V;  24V battery input: 23.0V;  48V battery input: 46.0V;</p>
example	<p>upper computer: BTG23.0\r  Inverter : ACK\r  Inverter is set the battery voltage for returning to mains mode as 23V.  Inverter response ACK then setting successfully, response NAK then setting failure.</p>
Query setting	<p>Upper computer send: BTG???\r  Inverter response: (23.0\r</p>

### 6.31.BTB<nn.n>\r

setting range	<p>When the OPR command sets the output of non-mains power priority, the battery can be charged to a certain amount of power if the photovoltaic energy is sufficient or mains power exists. This command can be used to determine the voltage and return to the battery mode after reaching a certain level to maximize the use of photovoltaic and battery power. The range of nn. n is as follows.</p> <p>12V battery input: 12.0~14.5V, or 00.0V (Charge the battery to float mode) ;  24V battery input: 24.0~29.0V, or 00.0V (Charge the battery to float mode) ;  48V battery input: 44.0~52.0V, or 00.0V (Charge the battery to float mode) ;</p>
default	<p>12V battery input: 13.5V;  24V battery input: 26.0V;</p>

	48V battery input: 54.0V;
example	upper computer: BTB26.0\r Inverter : ACK\r Inverter sets the BTB mode as battery floating charge voltage. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: BTB????\r Inverter response: (26.0\r

### 6.32.BTO<nn.n>\r

setting range	The scope of 'nn.n' as follows, 12V battery input: 14.0~16.0V; 24V battery input: 28.0~32.0V; 48V battery input: 56.0~64.0V;
default	12V battery input: 16.0V; 24V battery input: 32.0V; 48V battery input: 64.0V;
example	upper computer: BTO30.0\r Inverter : ACK\r Inverter is set the battery overvoltage point as 30V. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: BTO????\r Inverter response: (30.0\r

### 6.33.PAR<n>\r

setting range	n is range from 0~4 0 indicates the single-machine operation mode
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	1 indicates single-phase parallel mode 2: three-phase parallel mode (R phase) 2: three-phase parallel mode (S phase) 2: three-phase parallel mode (T phase)
default	0
example	upper computer: PAR1\r Inverter : ACK\r Inverter is set to single-phase parallel mode.. Inverter response ACK then setting successfully, response NAK then setting failure.
Query setting	Upper computer send: PAR?\r Inverter response: (0\r

### 6.34.SBAUD<n>\r

setting range	n is range from 0~4 0 indicates 2400 Baud rate 1 indicates 4800 Baud rate 2 indicates 9600 Baud rate 3 indicates 19200 Baud rate
default	0
example	upper computer: SBAUD2\r Inverter : ACKBAUD2\r The corresponding port baud rate of the inverter is set to 9600。 Inverter response ACK then setting successfully, response NAK then setting failure.

## 7. Calibration command

### 7.1. BA0\r

setting range	non
example	upper computer: BT0\r Inverter : ACK\r Inverter Restore the battery calibration default value.

### 7.2. B1A<nn.n>\r

setting range	nn. n indicates the battery voltage measured by the multimeter, in unit V
example	upper computer: B1A21.0\r Inverter : ACK\r Inverter Set the battery high voltage calibration point to 27V.

### 7.3. B2A<nn.n>\r

setting range	nn. n indicates the battery voltage measured by the multimeter, in unit V
example	upper computer: B2A27.0\r Inverter : ACK\r Inverter Set the battery low voltage calibration point to 27V.

Note: The Inverter voltage calibration adopts two-stage calibration. B1A and B2A commands must be used at the same time to complete the battery voltage calibration process.

### 7.4. PV<nnn.n>\r

setting range	nn. n is the voltage of the photovoltaic panel actually measured by the multimeter, in unit V
example	upper computer: PV150.0\r Inverter : ACK\r Inverter Set the photovoltaic panel calibration voltage point as 150V.

## 7.5. BUN±<nn>\r

setting range	nn ranges from 00 to 99
example	upper computer: BUN+10\r Inverter : ACK\r Inverter Set and adjust bus voltage. upper computer: BUN-10\r Inverter : ACK\r Inverter Set the display value of adjusting bus voltage.
Query calibration result	Upper computer send: BUN???\r Inverter response: (2048\r

## 7.6. LVR±<nn>\r

setting range	nn ranges from 00 to 99
example	upper computer: LVR+10\r Inverter : ACK\r Inverter Set the sampling value to increase the mains voltage. upper computer: LVR-10\r Inverter : ACK\r Inverter Set the sampling value to decrease the mains voltage.
Query calibration result	Upper computer send: LVR???\r Inverter response: (2048\r

## 7.7. VDR±<nn>\r

setting range	nn ranges from 00 to 99
example	upper computer: VDR+10\r Inverter : ACK\r Inverter Set the sampling value to increase the output voltage.

	upper computer: VDR-10\r Inverter : ACK\r Inverter Set the sampling value to decrease the output voltage.
Query calibration result	Upper computer send: VDR???\r Inverter response: (2048\r

## 7.8. OCR±<nn>\r

setting range	nn ranges from 00 to 99
example	upper computer: OCR+10\r Inverter : ACK\r Invertert increase the sampling value of the output display current.  upper computer: OCR-10\r Inverter : ACK\r Inverter decrease the sampling value of the output display current.
Query calibration result	Upper computer send: OCR???\r Inverter response: (2048\r

## 7.9. VR±<nn>\r

setting range	fine tuning: VR+.x 或 VR-.x; x=1~9 corresponds to 0.1~0.9V; coarse tuning: VR+0x 或 Vn-0x; x=1~9 corresponds to 1~9V;
example	upper computer: VR+02\r Inverter : ACK\r Inverter Set the sampling value to increase the inverter voltage by 2V. upper computer: VR+.2\r Inverter : ACK\r InverterSet the sampling value to increase the inverter voltage by 0.2V.
Query calibration result	Upper computer send: VR???\r Inverter response: (2048\r

## 7.10. IR±<nn>\r

setting range	nn ranges from 00 to 99
example	<p>upper computer: IR+10\r</p> <p>Inverter : ACK\r</p> <p>Inverter Set the sampling value for increasing the inverter current.</p> <p>upper computer: IR-10\r</p> <p>Inverter : ACK\r</p> <p>Inverter Set the sampling value to reduce the inverter current.</p>
Query calibration result	<p>Upper computer send: IR???\r</p> <p>Inverter response: (2048\r</p>

## 7.11. DCR±<nn>\r

setting range	nn ranges from 00 to 99
example	<p>upper computer: DCR+10\r</p> <p>Inverter : ACK\r</p> <p>Inverter Calibrate the DC component output.</p> <p>upper computer: DCR-10\r</p> <p>Inverter : ACK\r</p> <p>Inverter Calibrate the DC component output.</p>
Query calibration result	<p>Upper computer send: DCR???\r</p> <p>Inverter response: (2048\r</p>

## 7.12. CHI±<nn>\r

setting range	nn ranges from 00 to 99
example	<p>upper computer: CHI+10\r</p> <p>Inverter : ACK\r</p>



	Inverter Calibrate the charging current.  upper computer: CHI-10\r Inverter : ACK\r Inverter Calibrate the charging current.
Query calibration result	Upper computer send: CHI???\r Inverter response: (2048\r

### 7.13. LWT±<nn>\r

setting range	nn ranges from 00 to 99
example	upper computer: LWT+10\r Inverter : ACK\r Inverter Calibrate the output active power.  upper computer: LWT-10\r Inverter : ACK\r Inverter Calibrate the output active power.
Query calibration result	Upper computer send: LWT???\r Inverter response: (2048\r

### 7.14. LVA±<nn>\r

setting range	nn ranges from 00 to 99
example	upper computer: LVA+10\r Inverter : ACK\r Inverter Calibrate the output complex power.  upper computer: LVA-10\r Inverter : ACK\r Inverter Calibrate the output complex power.
Query calibration result	Upper computer send: LVA???\r Inverter response: (2048\r

### 7.15. TFA<nnnn>\r

setting range	nnnn ranges from 0000 to 3000, The unit is 0.1 V
default	2200
example	upper computer: TFA2284\r Inverter : ACK\r Inverter Calibration transformer no-load voltage is 228.4V
Query calibration result	Upper computer send: TFA????\r Inverter response: (2284\r

### 7.16. TFB<nnnn>\r

setting range	nnnn ranges from 0000 to 3000, The unit is 0.1 V
default	2200
example	upper computer: TFB2254\r Inverter : ACK\r Inverter: The calibration transformer has a full load voltage of 225.4V.
Query calibration result	Upper computer send: TFB????\r Inverter response: (2254\r