Inverter Communication Protocol

RJ45 to RS232 or USB cable between computer and device

The connection between P1 and P2

P1	wire color	P2	Function
1	white and orange	2	TXD
2	blue	3	RXD
8	white and green	5	GND
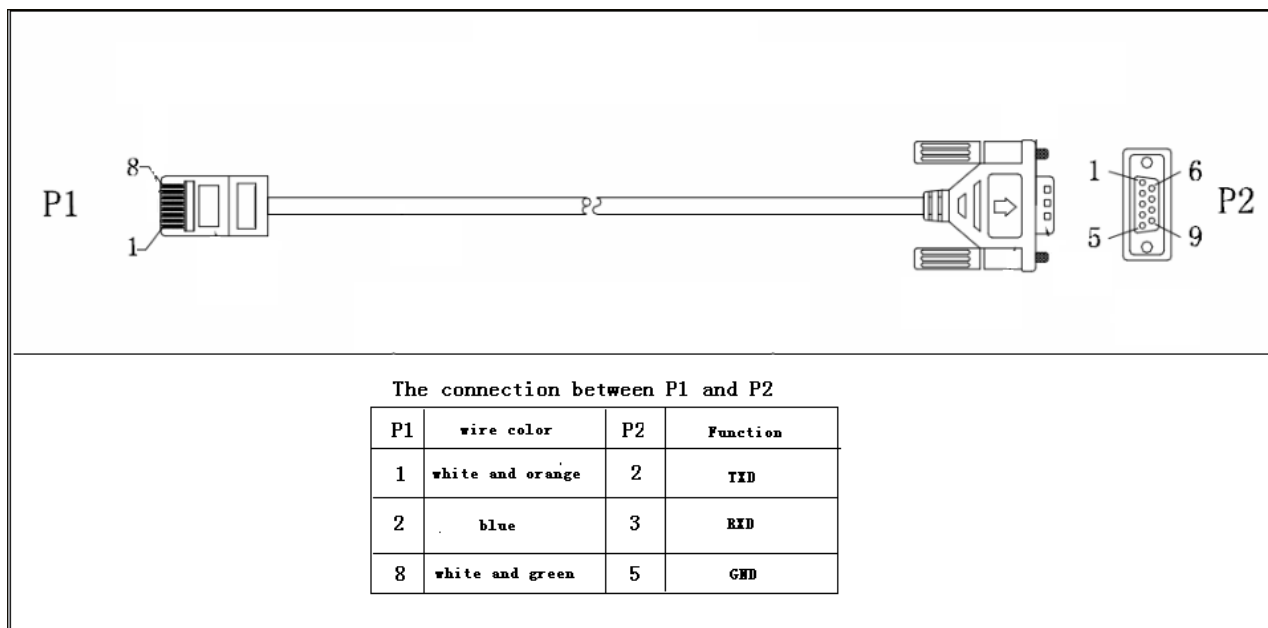
1 Communication format

Baud rate	Start bit	Data bit	Parity bit	Stop bit
2400	1	8	N	1

2 Inquiry Command

2.1 QPI<cr>: Device Protocol ID Inquiry

Computer: QPI<CRC><cr>

Device: (PI<N_3N_4> <CRC><cr>

N is an integer number ranging from 0 to 9.

Function: To request the device Protocol ID.

Protocol ID distribution: 30

2.2 QID<cr>: The device serial number inquiry

Computer: QID <CRC><cr>

Device: ($X_1X_2X_3X_4X_5X_6X_7X_8X_9X_{10}X_{11}X_{12}X_{13}X_{14}$<CRC><cr>

2.3 QVFW<cr>: Inverter CPU Firmware version inquiry

Computer: QVFW<CRC><cr>

Device: (VERFW: < $N_7N_8N_9N_{10}N_{11}.N_{13}N_{14}$><CRC><cr>

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

Example:

Computer: QVFW<CRC><cr>

Device: (VERFW: 00123.01<CRC><cr>

00123: firmware series number；01：version

2.4　QVFW2<cr> : SCC1 CPU Firmware version inquiry

Computer: QVFW2<CRC><cr>

UPS: (VERFW2: < $N_8N_9N_{10}N_{11}N_{12}.N_{14}N_{15}$ ><CRC><cr>

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

If $N_8N_9N_{10}N_{11}N_{12}.N_{14}N_{15}$ = 00000.00, it means SCC1 not send firmware version information to inverter.

2.5　QVFW3<cr> : SCC2 CPU Firmware version inquiry

Computer: QVFW3<CRC><cr>

UPS: (VERFW3: < $N_8N_9N_{10}N_{11}N_{12}.N_{14}N_{15}$ ><CRC><cr>

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

If $N_8N_9N_{10}N_{11}N_{12}.N_{14}N_{15}$ = 00000.00, it means SCC2 not send firmware version information to inverter.

2.6　QVFW4<cr> : SCC3 CPU Firmware version inquiry

Computer: QVFW4<CRC><cr>

UPS: (VERFW4: < $N_8N_9N_{10}N_{11}N_{12}.N_{14}N_{15}$ ><CRC><cr>

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

If $N_8N_9N_{10}N_{11}N_{12}.N_{14}N_{15}$ = 00000.00, it means SCC2 not send firmware version information to inverter.

2.7　QPIRI<cr>: Device Rating Information inquiry

Computer: QPIRI<CRC><cr>

Device: ($N_1N_2N_3.N_5$ $N_7N_8.N_{10}$ $N_{12}N_{13}N_{14}.N_{16}$ $N_{18}N_{19}.N_{21}$ $N_{23}N_{24}.N_{26}$ $N_{28}N_{29}N_{30}N_{31}$ $N_{33}N_{34}N_{35}N_{36}$ $N_{38}N_{39}.N_{41}$ $N_{43}N_{44}.N_{46}$ $N_{48}N_{49}.N_{51}$ $N_{53}N_{54}.N_{56}$ $N_{58}N_{59}.N_{61}$ N_{63} $N_{65}N_{66}$ $N_{68}N_{69}N_{70}$ N_{72} N_{74} N_{76} N_{78} N_{80} N_{81} N_{83} N_{85} $N_{87}N_{88}.N_{90}$ N_{92} N_{94}<CRC><cr>

	Symbol	Description	Notes / Unit
1.	(	Start byte	N: the integer from 0 to 9
2.	$N_1N_2N_3.N_5$	Grid rating voltage	V
3.	$N_7N_8.N_{10}$	Grid rating current	A
4.	$N_{12}N_{13}N_{14}.N_{16}$	AC output rating voltage	V
5.	$N_{18}N_{19}.N_{21}$	AC output rating frequency	Hz
6.	$N_{23}N_{24}.N_{26}$	AC output rating current	A
7.	$N_{28}N_{29}N_{30}N_{31}$	AC output rating　apparent　power	VA
8.	$N_{33}N_{34}N_{35}N_{36}$	AC output rating active power	W

9.	$N_{38}N_{39}.N_{41}$	Battery rating voltage	V
10.	$N_{43}N_{44}.N_{46}$	Battery re-charge voltage	V
11.	$N_{48}N_{49}.N_{51}$	Battery under voltage	V
12.	$N_{53}N_{54}.N_{56}$	Battery bulk voltage	V
13.	$N_{58}N_{59}.N_{61}$	Battery float voltage	V
14.	N_{63}	Battery type	0: AGM 1: Flooded 2: User
15.	$N_{65}N_{66}$	Current max AC charging current	A
16.	$N_{68}N_{69}N_{70}$	Current max charging current	A
17.	N_{72}	Input voltage range	0: Appliance 1: UPS
18.	N_{74}	Output source priority	0: Utility first 1: Solar first 2: SBU first

19.	N_{76}	Charger source priority	For KS and Plus Duo Series:
			  0: Utility first
			  1: Solar first
			  2: Solar + Utility
			  3: Only solar charging permitted
			For MKS Series 1K~3K:
			  0: Utility first
			  1: Solar first
			  2: Solar + Utility
			  3: Only solar charging permitted

20.	N_{78}	Parallel max num	For KS & MKS 4K~5K
21.	$N_{80}N_{81}$	Machine type	00: Grid tie; 01: Off Grid; 10: Hybrid. 11: Off Grid with 2 Trackers 20: Off Grid with 3 Trackers
22.	N_{83}	Topology	0: Transformerless 1: Transformer
23.	N_{85}	Output mode	00: single machine output 01: parallel output 02: Phase 1 of 3 Phase output 03: Phase 2 of 3 Phase output 04: Phase 3 of 3 Phase output
24.	$N_{87}N_{88}.N_{90}$	Battery re-discharge voltage	V
25.	N_{92}	PV OK condition for parallel	0: As long as one unit of inverters has connect PV, parallel system will consider PV OK; 1: Only All of inverters have connect PV,

26.	N_{94}	PV power balance	0: PV input max current will be the max charged current; 1: PV input max power will be the sum of the max charged power and loads power.
			parallel system will consider PV OK

2.8 QFLAG<cr>: Device flag status inquiry

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

x	Control setting
A	Enable/disable silence buzzer or open buzzer
B	Enable/Disable overload bypass function
J	Enable/Disable power saving
K	Enable/Disable LCD display escape to default page after 1min timeout
U	Enable/Disable overload restart
V	Enable/Disable over temperature restart
X	Enable/Disable backlight on
Y	Enable/Disable alarm on when primary source interrupt
Z	Enable/Disable fault code record
L	Enable/Disable data log pop-up

Computer: QFLAG <CRC><cr>

Device: (ExxxDxxx <CRC><cr>

2.9 QPIGS<cr>: Device general status parameters inquiry

Computer: QPIGS <CRC><cr>

Device: $(N_1N_2N_3.N_5\ N_7N_8.N_{10}\ N_{12}N_{13}N_{14}.N_{16}\ N_{18}N_{19}.N_{21}\ N_{23}N_{24}N_{25}N_{26}\ N_{28}N_{29}N_{30}N_{31}\ N_{33}N_{34}N_{35}\ N_{37}N_{38}N_{39}\ N_{41}N_{42}.N_{44}N_{45}\ N_{47}N_{48}N_{49}\ N_{51}N_{52}N_{53}\ N_{55}N_{56}N_{57}N_{58}\ N_{60}N_{61}N_{62}N_{63}\ N_{65}N_{66}N_{67}.N_{69}\ N_{71}N_{72}.N_{74}N_{75}\ N_{77}N_{78}N_{79}N_{80}N_{81}\ b_{83}b_{84}b_{85}b_{86}b_{87}b_{88}b_{89}b_{90}\ N_{92}N_{93}\ N_{95}N_{96}\ N_{98}N_{99}N_{100}N_{101}N_{102}\ b_{104}b_{105}b_{106}$ <CRC><cr>

	Symbol	Description	Notes / Unit
1.	(	Start byte	N: the integer from 0 to 9
2.	$N_1N_2N_3.N_5$	Grid voltage	V
3.	$N_7N_8.N_{10}$	Grid frequency	Hz
4.	$N_{12}N_{13}N_{14}.N_{16}$	AC output voltage	V
5.	$N_{18}N_{19}.N_{21}$	AC output frequency	Hz
6.	$N_{23}N_{24}N_{25}N_{26}$	AC output apparent power	VA
7.	$N_{28}N_{29}N_{30}N_{31}$	AC output active power	W

8.	$N_{33}N_{34}N_{35}$	Output load percent	HHH is the maximum one of W% or VA% value. VA% is a percent of apparent power. W% is a percent of active power. The unit is %.
9.	$N_{37}N_{38}N_{39}$	BUS voltage	V
10.	$N_{41}N_{42}.N_{44}N_{45}$	Battery voltage	V
11.	$N_{47}N_{48}N_{49}$	Battery charging current	A
12.	$N_{51}N_{52}N_{53}$	Battery capacity	%
13.	$N_{55}N_{56}N_{57}N_{58}$	Inverter heat sink temperature	The unit is ℃（NTC A/D value for 1~3KVA ）
14.	$N_{60}N_{61}N_{62}N_{63}$	~~PV Input current for battery.~~ PV Input current 1	A
15.	$N_{65}N_{66}N_{67}.N_{69}$	PV Input voltage 1	V
16.	$N_{71}N_{72}.N_{74}N_{75}$	Battery voltage from SCC 1	V
17.	$N_{77}N_{78}N_{79}N_{80}N_{81}$	Battery discharge current	A
18.	$b_{83}b_{84}b_{85}b_{86}b_{87}b_{88}b_{89}b_{90}$	Device status	b_{83}: add SBU priority version, 1: yes, 0: no b_{84}: configuration status: 1: Change 0: unchanged b_{85}: SCC firmware version 1: Updated 0: unchanged b_{86}: Load status: 0: Load off 1:Load on b_{87}: battery voltage to steady while charging b_{88}: Charging status(Charging on/off) b_{89}: Charging status(SCC1 charging on/off) B_{90}: Charging status(AC charging on/off) $b_{88}b_{89}b_{90}$: 000: Do nothing 110: Charging on with SCC1 charge on 101: Charging on with AC charge on 111: Charging on with SCC1

			and AC charge on
19.	$N_{92}N_{93}$	Battery voltage offset for fans on	10mV
20.	$N_{95}N_{96}$	EEPROM version	
21.	$N_{98}N_{99}N_{100}N_{101}N_{102}$	PV Charging power 1	Watt
22.	$b_{104}b_{105}b_{106}$	Device status	B_{104}: flag for charging to floating mode b_{105}: Switch On b_{106}: reserved

2.10 QPIGS2<cr>: Device general status parameters inquiry

Computer: QPIGS 2<CRC><cr>

Device: $(N_1N_2N_3N_4 \quad N_6N_7N_8.N_{10} \quad N_{12}N_{13}.N_{15}N_{16} \quad N_{18}N_{19}N_{20}N_{21}N_{22} \quad b_{24}b_{25}b_{26}b_{27}b_{28}b_{29}b_{30}b_{31}$ $N_{33}N_{34}N_{35}N_{36} \quad N_{38}N_{39}N_{40}N_{41} \quad N_{42}N_{43}N_{44}N_{45} \quad N_{47}N_{48}N_{49}.N_{51} \quad N_{53}N_{54}.N_{56}N_{57} \quad N_{58}N_{59}N_{60}N_{61}$ $N_{63}N_{64}N_{65}N_{66}N_{67}$<CRC><cr>

	Symbol	Description	Notes / Unit
1.	(	Start byte	N: the integer from 0 to 9
2.	$N_1N_2N_3N_4$	PV Input current 2	A
3.	$N_6N_7N_8.N_{10}$	PV Input voltage 2	V
4.	$N_{12}N_{13}.N_{15}N_{16}$	Battery voltage from SCC 2	V
5.	$N_{18}N_{19}N_{20}N_{21}N_{22}$	PV Charging power 2	Watt
6.	$b_{24}b_{25}b_{26}b_{27}b_{28}b_{29}b_{30}b_{31}$	Device status	b_{24}: Charging status(SCC2 charging on/off) b_{25}: Charging status(SCC3 charging on/off) b_{26}~ b_{31}: Reserved
7.	$N_{33}N_{34}N_{35}N_{36}$	AC charging current	A
8.	$N_{38}N_{39}N_{40}N_{41}$	AC charging power	W
9.	$N_{42}N_{43}N_{44}N_{45}$	PV Input current 3	A
10.	$N_{47}N_{48}N_{49}.N_{51}$	PV Input voltage 3	V
11.	$N_{53}N_{54}.N_{56}N_{57}$	Battery voltage from SCC 3	V
12.	$N_{58}N_{59}N_{60}N_{61}$	PV Charging power 3	Watt
13.	$N_{63}N_{64}N_{65}N_{66}N_{67}$	PV total charging power	Watt

2.11 QPGSn<cr>: Parallel Information inquiry（For 4K/5K）

Computer: QPGSn<CRC><cr>

Device: (A BBBBBBBBBBBBBB C DD EEE.E FF.FF GGG.G HH.HH IIII JJJJ KKK LL.L MMM NNN OOO.O PPP QQQQQ RRRRR SSS $b_7b_6b_5b_4b_3b_2b_1b_0$ T U VVV WWW ZZ XX YYY<CRC><cr>

	Data	Description	Notes

A	(	Start byte	
B	A	The parallel num whether exist	0：No exist. 1：Exist.
C	BBBBBBBB BBBBBB	Serial number	B is an Integer ranging from 0 to 9.
D	C	Work mode	C is an character, refer to QMOD
E	DD	Fault code	D is an Integer ranging from 0 to 9.
F	EEE.E	Grid voltage	E is an Integer ranging from 0 to 9. The units is V.
G	FF.FF	Grid frequency	F is an Integer ranging from 0 to 9. The unit is Hz.
H	GGG.G	AC output voltage	G is an Integer ranging from 0 to 9. The units is V.
I	HH.HH	AC output frequency	H is an Integer ranging from 0 to 9. The unit is Hz.
J	IIII	AC output apparent power	I is an Integer number from 0 to 9. The units is VA
K	JJJJ	AC output active power	J is an Integer ranging from 0 to 9. The units is W.
L	KKK	Load percentage	K is an Integer ranging from 0 to 9. The unit is %.
M	LL.L	Battery voltage	L is an Integer ranging from 0 to 9. The unit is V.
N	MMM	Battery charging current	M is an Integer ranging from 0 to 9. The units is A.
O	NNN	Battery capacity	N is an Integer ranging from 0 to 9. The unit is %.
P	OOO. O	PV Input Voltage	O is an Integer ranging from 0 to 9. The units is V.
Q	PPP	Total charging current	P is an Integer ranging from 0 to 9. The units is A.
R	QQQQQ	Total AC output apparent power	Q is an Integer ranging from 0 to 9. The unit is VA.
S	RRRRR	Total output active power	R is an Integer ranging from 0 to 9. The units is W.
T	SSS	Total AC output percentage	S is an Integer ranging from 0 to 9. The unit is %.
U	b7b6b5b4b3b2b1b0	Inverter Status	b7: 1 SCC OK, 0 SCC LOSS b6: 1 AC Charging 0 AC no charging b5: 1 SCC Charging

			0 SCC no charging
			b4b3: 2 battery open, 1 battery under, 0 battery normal
			b2: 1 Line loss
			0 Line ok
			b1: 1 load on, 0 load off
			b0: configuration status:
			1: Change 0: unchanged
V	T	Output mode	0: single machine
			1: parallel output
			2: Phase 1 of 3 phase output
			3: Phase 2 of 3 phase output
			4: Phase 3 of 3 phase output
W	U	Charger source priority	0: Utility first
			1: Solar first
			2: Solar + Utility
			3: Solar only
X	VVV	Max charger current	V is an Integer ranging from 0 to 9. The units is A.
Y	WWW	Max charger range	W is an Integer ranging from 0 to 9. The units is A.
Z	ZZ	Max AC charger current	Z is an Integer ranging from 0 to 9. The units is A.
a	XX	PV input current for battery	X is an Integer ranging from 0 to 9. The units is A.
b	YYY	Battery discharge current	Y is an Integer ranging from 0 to 9. The units is A.

2.12 QP2GSn<cr>: Parallel Information inquiry（For 4K/5K）

Computer: QP2GSn<CRC><cr>

Device: (A BBBBB CCC.C DDDD EEEEE FFF.F GGGG HHHHH $I_1I_2I_3I_4I_5I_6I_7I_8$<CRC><cr>

	Data	Description	Notes
A	(	Start byte	
B	A	The parallel num whether exist	0：No exist. 1：Exist.
C	BBBBB	PV1 charging power	B is an Integer ranging from 0 to 9. The unit is W.
D	CCC.C	PV2 input voltage	C is an Integer ranging from 0 to 9. The units is V.
E	DDDD	PV2 input current	D is an Integer ranging from 0 to

			9. The unit is A.
F	EEEEE	PV2 charging power	E is an Integer ranging from 0 to 9. The units is W.
G	FFF.F	PV3 input voltage	F is an Integer ranging from 0 to 9. The unit is V.
H	GGGG	PV3 input current	G is an Integer ranging from 0 to 9. The units is A.
I	HHHHH	PV3 charging power	H is an Integer ranging from 0 to 9. The units is W.
J	$I_1I_2I_3I_4I_5I_6I_7I_8$	SCC status	I_1: 1: SCC2 OK, 0: SCC2 LOSS I_2: 1: SCC2 Charging, 0: SCC2 do no charging I_3: 1: SCC3 OK, 0: SCC3 LOSS I_4: 1: SCC3 Charging, 0: SCC3 do no charging I_5~I_8: Reserved

2.13 QMOD<cr>: Device Mode inquiry

Computer: QMOD<CRC><cr>

Device: (M<CRC><cr>

MODE	CODE(M)	Notes
Power On Mode	P	Power on mode
Standby Mode	S	Standby mode
Line Mode	L	Line Mode
Battery Mode	B	Battery mode
Fault Mode	F	Fault mode
Power saving Mode	H	Power saving Mode

Example:

Computer: QMOD<CRC><cr>

DEVICE: (L<CRC><cr>

Means: the current DEVICE mode is Grid mode.

2.14 QPIWS<cr>: Device Warning Status inquiry

Computer: QPIWS<CRC> <cr>

Device: (b_1b_2…..$b_{31}b_{32}$ $b_{33}b_{34}$ $b_{35}b_{36}b_{37}b_{38}$<CRC><cr>

b_1b_2…..$b_{31}b_{32}$ $b_{33}b_{34}$ $b_{35}b_{36}b_{37}b_{38}$ 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	Description

b_1	Reserved	
b_2	Inverter fault	Fault
b_3	Bus Over	Fault
b_4	Bus Under	Fault
b_5	Bus Soft Fail	Fault
b_6	LINE_FAIL	Warning
b_7	OPVShort	Warning
b_8	Inverter voltage too low	Fault
b_9	Inverter voltage too high	Fault
b_{10}	Over temperature	Compile with a1, if a1=1,fault, otherwise warning
b_{11}	Fan locked	Compile with a1, if a1=1,fault, otherwise warning
b_{12}	Battery voltage high	Compile with a1, if a1=1,fault, otherwise warning
b_{13}	Battery low alarm	Warning
b_{14}	Reserved(Overcharge)	
b_{15}	Battery under shutdown	Warning
b_{16}	Reserved((Battery derating)	Warning
b_{17}	Over load	Compile with a1, if a1=1,fault, otherwise warning
b_{18}	Eeprom fault	Warning
b_{19}	Inverter Over Current	Fault
b_{20}	Inverter Soft Fail	Fault
b_{21}	Self Test Fail	Fault
b_{22}	OP DC Voltage Over	Fault
b_{23}	Bat Open	Fault
b_{24}	Current Sensor Fail	Fault
b_{25}	Battery Short	Fault
b_{26}	Power limit	Warning
b_{27}	PV voltage high 1	Warning
b_{28}	MPPT overload fault 1	Warning
b_{29}	MPPT overload warning 1	Warning
b_{30}	Battery too low to charge 1	Warning
b_{31}	PV voltage high 2	Warning
b_{32}	MPPT overload fault 2	Warning
b_{33}	MPPT overload warning 2	Warning
b_{34}	Battery too low to charge 2	Warning

b_{35}	PV voltage high 3	Warning
b_{36}	MPPT overload fault 3	Warning
b_{37}	MPPT overload warning 3	Warning
b_{38}	Battery too low to charge 3	Warning

2.15   QDI\<cr\>: The default setting value information

Computer: QDI\<CRC\>\<cr\>

Device: $(N_1N_2N_3.N_5$ $N_7N_8.N_{10}$ $N_{12}N_{13}N_{14}N_{15}$ $N_{16}N_{17}.N_{19}$ $N_{21}N_{22}.N_{24}$ $N_{26}N_{27}.N_{29}$ $N_{30}N_{31}.N_{33}$ $N_{35}N_{36}$ N_{38} N_{40} N_{42} N_{44} N_{46} N_{48} N_{50} N_{52} N_{54} N_{56} N_{58} N_{60} N_{62} N_{64} $N_{66}N_{67}.N_{69}$ N_{71} N_{73} N_{75} N_{77} $N_{79}N_{80}N_{81}$ $N_{83}N_{84}N_{85}$\<CRC\>\<cr\>

	Symbol	Description	Notes / Unit	INVERTER	
1.	(	Start byte	N: the integer from 0 to 9		
2.	$N_1N_2N_3.N_5$	AC output voltage	V	Default 230.0	
3.	$N_7N_8.N_{10}$	AC output frequency	Hz	Default 50.0	
4.	$N_{12}N_{13}N_{14}N_{15}$	KS&MKS: Max AC charging current MKS Plus Duo: Max charging current	A	KS-1000	20A
				MKS-1000-24	
				KS-2000	30A
				KS-3000	
				KS-4000	
				KS-5000	
				MKS-2000-24	
				MKS-3000-24	
				MKS-2000-24 Plus	
				MKS-3000-24 Plus	
				MKS-1000-48	15A
				MKS-2000-48	
				MKS-3000-48	
				MKS-2000-48 Plus	
				MKS-3000-48 Plus	
				MKS-1500-12 Plus Duo	60A
				MKS-1500-48 Plus Duo	
				MKS-3000-24 Plus Duo	
				MKS-3000-48 Plus Duo	
5.	$N_{16}N_{17}.N_{19}$	Battery Under voltage	V	KS&MKS Series: 10.5V/21.0V/42.0V for 12V/24V/48V model Plus Duo Series: 10.2V/20.4V/40.8V for 12V/24V/48V	

				model
6.	$N_{21}N_{22}.N_{24}$	Charging float voltage	V	13.5V/27.0V/54.0V for 12V/24V/48V model
7.	$N_{26}N_{27}.N_{29}$	Charging bulk voltage	V	14.1V/28.2V/56.4V for 12V/24V/48V model
8.	$N_{30}N_{31}.N_{33}$	Battery default re-charge voltage	V	11.5/23/46 for 12/24/48V unit.
9.	$N_{35}N_{36}$	KS&MKS: Max charging current MKS Plus Duo: Max AC charging current	A	(see table below)
10.	N_{38}	AC input voltage range		Default **0** for **Appliance** range
11.	N_{40}	Output source priority		Default 0 for **Utility** first
12.	N_{42}	Charger source priority		Default 0 for **Utility** first
13.	N_{44}	Battery type		Default 0 for **AGM**
14.	N_{46}	Enable/disable silence buzzer or open buzzer		Default 0 for enable buzzer
15.	N_{48}	Enable/Disable power saving		Default 0 for disable power saving
16.	N_{50}	Enable/Disable overload restart		Default 0 for disable overload restart
17.	N_{52}	Enable/Disable over temperature restart		Default 0 for disable over temperature restart
18.	N_{54}	Enable/Disable LCD backlight on		Default 1 for enable LCD backlight on

Item 9 charging current table:

Model	Current
KS Series	50A
MKS-1000-24	25A (not show)
MKS-2000-24	25A (not show)
MKS-3000-24	25A (not show)
MKS-1000-48	25A (not show)
MKS-2000-48	25A (not show)
MKS-3000-48	25A (not show)
MKS-4000	60A
MKS-5000	60A
MKS-2000-48	60A
MKS-3000-48	60A
MKS-2000-48 Plus	60A
MKS-3000-48 Plus	60A
MKS-1500-12 Plus Duo	30A
MKS-1500-48 Plus Duo	30A
MKS-3000-24 Plus Duo	30A
MKS-3000-48 Plus Duo	30A

19.	N_{56}	Enable/Disable alarm on when primary source interrupt		Default 1 for enable alarm on when primary source interrupt
20.	N_{58}	Enable/Disable fault code record		Default 0 for disable fault code record
21.	N_{60}	Overload bypass		Default 0 for disable overload bypass function
22.	N_{62}	Enable/Disable LCD display escape to default page after 1min timeout		Default 1 for LCD display escape to default page
23.	N_{64}	Output mode		Default 0 for single output
24.	$N_{66}N_{67}.N_{69}$	Battery re-discharge voltage	V	13.5/27/54 for 12/24/48V unit.
25.	N_{71}	PV OK condition for parallel		Only for KS-4000, KS-5000, MKS-4000, MKS-5000; 0: As long as one unit of inverters has connect PV, parallel system will consider PV OK;
26.	N_{73}	PV power balance		Only for KS-4000, KS-5000, MKS-4000, MKS-5000; 0: PV input max current will be the max charged current;
27.	N_{75}	Charging stage		Default 0 is for charging stage auto-determined by unit. (1: 2-stage, 2: 3-stage)
28.	N_{77}	Enable or disable data log pop-up function		Only for MKS Plus Duo Series Default 0 is for disable data log pop-up
29.	$N_{79}N_{80}N_{81}$	Maximum Solar charging current		MKS-1500-12 Plus Duo / MKS-3000-24 Plus Duo — 80A; MKS-1500-48 Plus Duo / MKS-3000-48 Plus Duo — 40A
30.	$N_{83}N_{84}N_{85}$	Charge time in CV mode	Minute	Default 255 is for CV charging time auto-determined by unit.

2.16 QMCHGCR<cr>: Enquiry selectable value about max charging current

Computer: QMCHGCR<CRC><cr>

Device: ($N_1N_2N_3$ $N_5N_6N_7$ $N_9N_{10}N_{11}$ $N_{13}N_{14}N_{15}$ ……<CRC><cr>

More value can be added, make sure there is a space character between each value.

2.17 QMUCHGCR<cr>: Enquiry selectable value about max utility charging current

Computer: QMUCHGCR<CRC><cr>

Device: $(N_1N_2N_3\ N_5N_6N_7\ N_9N_{10}N_{11}\ N_{13}N_{14}N_{15}\cdots\cdots$<CRC><cr>

More value can be added, make sure there is a space character between every value.

2.18 QMSCHGCR<cr>: Enquiry selectable value about max solar charging current

Computer: QMSCHGCR<CRC><cr>

Device: $(N_1N_2N_3\ N_5N_6N_7\ N_9N_{10}N_{11}\ N_{13}N_{14}N_{15}\cdots\cdots$<CRC><cr>

More value can be added, make sure there is a space character between every value.

2.19 QBOOT<cr>: Enquiry DSP has bootstrap or not

Computer: QBOOT<CRC><cr>

Device: (1/0<CRC><cr> if device accepts this command, otherwise, responds (NAK<cr>

When: if dsp has bootstrap, return 1.

2.20 QOPM<cr>: Enquiry output mode (For 4000/5000)

Computer: QOPM<CRC><cr>

Device: (nn<CRC><cr>

nn:

00: single machine output

01: parallel output

02: Phase 1 of 3 Phase output

03: Phase 2 of 3 Phase output

04: Phase 3 of 3 Phase output

2.21 QCST<cr>: Inquiry charging stage

Computer: **QCST** <CRC><cr>

Device: (NN<CRC><cr>

NN: 00 - auto determined by unit, 01 – 2 stage, 02 – 3 stage

2.22 QCVT<cr>: Inquiry charging time in CV mode

Computer: **QCVT**<CRC><cr>

Device: (NNN<CRC><cr>

NNN: 0 – 0 minute, 240 – 240 minutes, 255 – auto determined by unit

NNN: 000, 010, 020, 040, 060, 090, 120, 150, 180, 210, 240, 255

3 Setting parameters Command

3.1 PE<XXX>/PD<XXX><CRC><cr>: setting some status enable/disable

Computer: PE<XXX>/PD<XXX><CRC><cr>

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

PExxxPDxxx set flag status. PE means enable, PD means disable

x	Control setting
A	Enable/disable silence buzzer or open buzzer
B	Enable/disable overload bypass
J	Enable/Disable power saving
K	Enable/Disable LCD display escape to default page after 1min timeout
U	Enable/Disable overload restart
V	Enable/Disable over temperature restart
X	Enable/Disable backlight on
Y	Enable/Disable alarm on when primary source interrupt
Z	Enable/Disable fault code record
L	Enable/Disable data log pop-up

3.2 PF<cr>: Setting control parameter to default value

Computer: PF<CRC><cr>

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

All Device parameters set to default value.

x	Parameter setting	
	Parameter	Default value
1.	AC output voltage	230.0V
2.	AC output frequency	50.0Hz
3.	Max charging current	KS Series — 50A; MKS-1000-24, MKS-2000-24, MKS-3000-24, MKS-1000-48, MKS-2000-48, MKS-3000-48 — 25A; MKS-4000, MKS-5000, MKS-2000-48, MKS-3000-48 — 60A

		MKS-2000-48 Plus		
		MKS-3000-48 Plus		
		MKS-1000-12 Plus Duo	60A	
		MKS-1000-48 Plus Duo		
		MKS-3000-24 Plus Duo		
		MKS-3000-48 Plus Duo		
4.	Max utility charging current	KS-1000	20A	
		MKS-1000-24		
		KS-2000	30A	
		KS-3000		
		KS-4000		
		KS-5000		
		MKS-2000-24		
		MKS-3000-24		
		MKS-2000-24 Plus		
		MKS-3000-24 Plus		
		MKS-1000-48	15A	
		MKS-2000-48		
		MKS-3000-48		
		MKS-2000-48 Plus		
		MKS-3000-48 Plus		
		MKS-1000-12 Plus Duo	30A	
		MKS-1000-48 Plus Duo		
		MKS-3000-24 Plus Duo		
		MKS-3000-48 Plus Duo		
5.	AC input voltage range	0: Appliance range		
6.	Output source priority	0: Utility first		
7.	Battery re-charge voltage	11.5/23/46 for 12/24/48V unit.		
8.	Charger source priority	0: Utility first		
9.	Battery type	0: AGM		
10.	Enable/disable buzzer alarm	1: Enable buzzer alarm		
11.	Enable/Disable power saving	0: Disable power saving		
12.	Enable/Disable overload restart	0: Disable overload restart		
13.	Enable/Disable over temperature restart	0: Disable over temperature restart		
14.	Enable/Disable LCD backlight on	1: Enable LCD backlight on		
15.	Enable/Disable alarm on when primary source interrupt	1: Enable beep on when primary source interrupt		
16.	Enable/Disable overload bypass when overload happened in battery mode	0: Disable overload bypass		
17.	Enable/Disable LCD display escape to	1: Enable LCD display escape to default page		

	default page after 1min timeout	
18.	Output mode	0: single output(for 4K/5K)
19.	float charging voltage	13.5/27/54 for 12/24/48V unit.
20.	Bulk charging voltage	14.1/28.2/56.4 for 12/24/48V unit.
21.	Battery cut-off voltage	KS&MKS Series: 10.5V/21.0V/42.0V for 12V/24V/48V model Plus Duo Series: 10.2V/20.4V/40.8V for 12V/24V/48V model
22.	Battery re-discharge voltage	13.5/27/54 for 12/24/48V unit.
23.	Enable/Disable fault record	0: Disable fault record
24.	Charger stage	0: 2 or 3 stage is auto-determined by unit
25.	Enable/Disable data log pop-up	0: Disable data log pop-up
26.	Maximum Solar charging current	Plus Duo: 80: 80A for 48V model 40: 40A for 12V/24V model
27.	Charger time in CV mode	255: CV charging time is auto-determined by unit

Note: The correct default value can be gain by QDI command.

3.3 MCHGC<nnn><cr>: Setting max charging current

Computer: MCHGC<nnn><CRC><cr>

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

Setting value can be gain by QMCHGCR command.

3.4 MNCHGC<mnnn><cr>: Setting max charging current (More than 100A)

Computer: MNCHGC<mnnn><CRC><cr>

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

Setting value can be gain by QMCHGCR command.

nnn is max charging current, m is parallel number.

3.5 MUCHGC<nnn><cr>: Setting utility max charging current

Computer: MUCHGC<nnn><CRC><cr>

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

Setting value can be gain by QMUCHGCR command.

3.6 MSCHGC<nnn><cr>: Setting solar max charging current

Computer: MSCHGC<nnn><CRC><cr>

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

Setting value can be gain by QMSCHGCR command.

3.7 F<nn><cr>: Setting device output rating frequency

Computer: F<nn><CRC><cr>

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

Set UPS output rating frequency to 50Hz.or 60Hz

3.8 POP<NN><cr>: Setting device output source priority

Computer: POP<NN><CRC><cr>

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

Set output source priority, 00 for utility first, 01 for solar first, 02 for SBU priority

3.9 PBCV<nn.n><cr>: Set battery re-charge voltage ~~for SBU priority~~

Computer: PBCV<nn.n><CRC><cr>

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

12V unit: 11V/11.3V/11.5V/11.8V/12V/12.3V/12.5V/12.8V

24V unit: 22V/22.5V/23V/23.5V/24V/24.5V/25V/25.5V

48V unit: 44V/45V/46V/47V/48V/49V/50V/51V

3.10 PBDV<nn.n><cr>: Set battery re-discharge voltage

Computer: PBDV<nn.n><CRC><cr>

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

12V unit: 00.0V12V/12.3V/12.5V/12.8V/13V/13.3V/13.5V/13.8V/14V/14.3V/14.5

24V unit: 00.0V/24V/24.5V/25V/25.5V/26V/26.5V/27V/27.5V/28V/28.5V/29V

48V unit: 00.0V48V/49V/50V/51V/52V/53V/54V/55V/56V/57V/58V

00.0V means battery is full(charging in float mode).

3.11 PCP<NN><cr>: Setting device charger priority

Computer: PCP<NN><CRC><cr>

Device: (ACK<CRC><cr> if device accepts this command, otherwise, responds

(NAK<CRC><cr>

    Set output source priority, ~~00 for utility first, 01 for solar first, 02 for solar and utility~~

    For KS: 00 for utility first, 01 for solar first, 02 for solar and utility, 03 for only solar charging

    For MKS: 00 for utility first, 01 for solar first, 03 for only solar charging

3.12 PGR<NN><cr>: Setting device grid working range

    Computer: PGR<NN><CRC><cr>

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

    Set device grid working range, 00 for appliance, 01 for UPS

3.13 PBT<NN><cr>: Setting battery type

    Computer: PBT<NN><CRC><cr>

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

    Set device grid working range, 00 for AGM, 01 for Flooded battery

3.14 POPM<nn ><cr>: Set output mode (For 4000/5000)

   Computer: POPM <nn ><CRC><cr>

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

   nn:

   00: single machine output

   01: parallel output

   02: Phase 1 of 3 Phase output

   03: Phase 2 of 3 Phase output

   04: Phase 3 of 3 Phase output

3.15 PPCP<MNN><cr>: Setting parallel device charger priority (For 4000/5000)

 Computer: PCP<MNN><CRC><cr>

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

 00 for utility first, 01 for solar first, 02 for solar and utility,03 for solar only

 M is parallel machine num.

3.16 PSDV<nn.n><cr>: Setting battery cut-off voltage (Battery under voltage)

 Computer: **PSDV** <nn.n><CRC><cr>

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

 nn.n: 40.0V ~ 48.0V for 48V unit

3.17 PCVV<nn.n><cr>: Setting battery C.V. (constant voltage) charging voltage

Computer: **PCVV** <nn.n><CRC><cr>

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

nn.n: 48.0V ~ 58.4V for 48V unit

3.18 PBFT<nn.n><cr>: Setting battery float charging voltage

Computer: **PBFT** <nn.n><CRC><cr>

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

nn.n: 48.0V ~ 58.4V for 48V unit

3.19 PCST<NN><cr>: Setting charging stage

Computer: **PCST** <NN><CRC><cr>

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

NN: 00 - auto determined by unit, 01 – 2 stage, 02 – 3 stage

3.20 PCVT<NNN><cr>: Setting charging time in CV mode

Computer: **PCVT**< NNN ><CRC><cr>

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

NNN: 0 – 0 minute, 240 – 240 minutes, 255 – auto determined by unit
NNN: 000, 010, 020, 040, 060, 090, 120, 150, 180, 210, 240, 255

3.21 PPVOKC<n ><cr>: Setting PV OK condition

Computer: **PPVOKC** <n><CRC><cr>

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

0: As long as one unit of inverters has connected PV, parallel system will consider PV OK;

1: Only all of inverters have connected PV, parallel system will consider PV OK.

3.22 PSPB<n ><cr>: Setting Solar power balance

Computer: **PSPB**<n><CRC><cr>

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

0: PV input max current will be the max charged current;

1: PV input max power will be the sum of the max charged power and loads power.

4   Appendix

4.1   CRC calibration method

CRC. c