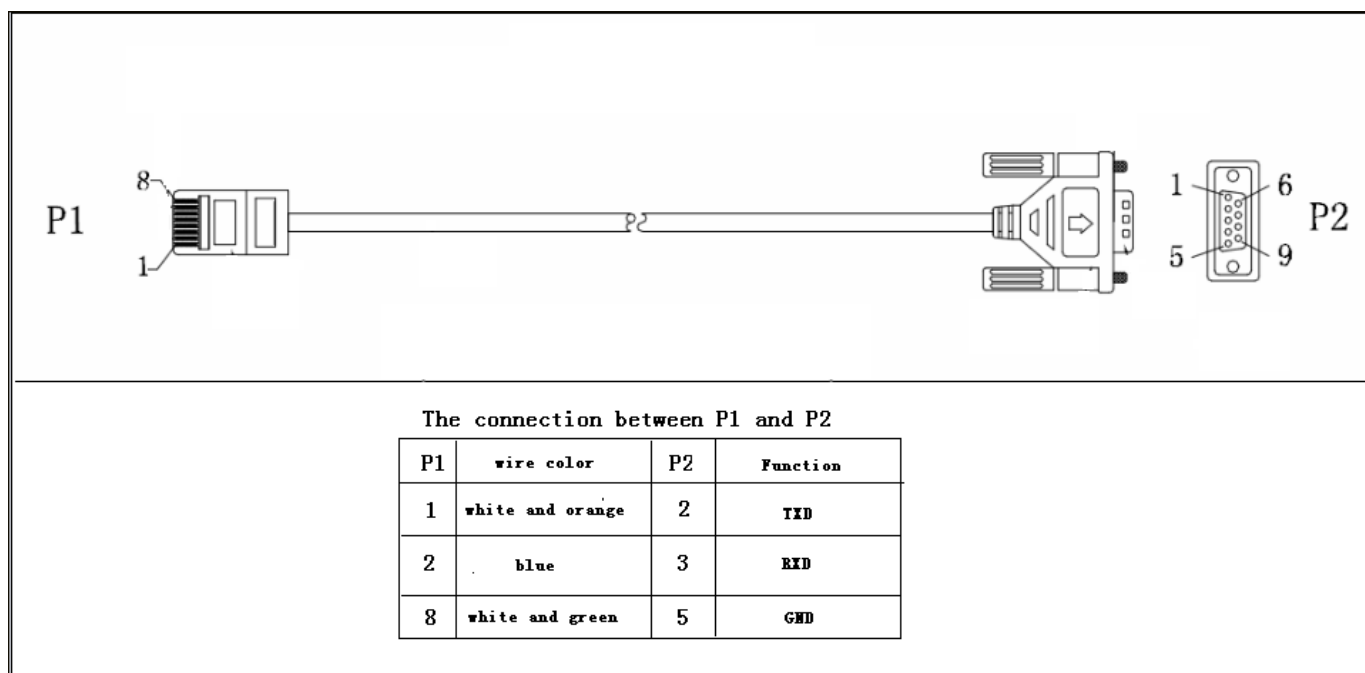


## **PIP-HS RS232 communication Protocol**

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## PIP-HS RS232 Communication Protocol

### RJ45 to RS232 cable between computer and device



## 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<NN> <CRC><cr>

N is an integer number ranging from 0 to 9.

Function: To request the device Protocol ID.

Protocol ID distribution: 30 for PIP-HS series

### 2.2 QID<cr>: The device serial number inquiry

Computer: QID <CRC><cr>

Device: (XXXXXXXXXXXXXXXXX <CRC><cr>

### 2.3 QVFW<cr>: Main CPU Firmware version inquiry

Computer: QVFW<CRC><cr>

Device: (VERFW:<NNNNN.NN><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> :Another CPU Firmware version inquiry

Computer: QVFW2<CRC><cr>

UPS: (VERFW2: <NNNNN.NN><CRC><cr>

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

### 2.5 QPIRI<cr>: Device Rating Information inquiry

Computer: QPIRI<CRC><cr>

Device: (BBB.B CC.C DDD.D EE.E FF.F HHHH IIII JJ.J KK.K JJ.J KK.K LL.L O P0 Q0  
O P Q R SS T <CRC><cr>

	Date	Description	Notes
A	(	Start byte	
B	BBB.B	Grid rating voltage	B is an integer ranging from 0 to 9. The units is V.
C	CC.C	Grid rating current	C is an Integer ranging from 0 to 9. The units is A.
D	DDD.D	AC output rating voltage	D is an Integer ranging from 0 to 9. The units is V.
E	EE.E	AC output rating frequency	E is an Integer ranging from 0 to 9. The units is Hz.
F	FF.F	AC output rating current	F is an Integer ranging from 0 to 9. The unit is A.
H	HHHH	AC output rating apparent power	H is an Integer ranging from 0 to 9. The unit is VA.
I	IIII	AC output rating active power	I is an Integer ranging from 0 to 9. The unit is W.
J	JJ.J	Battery rating voltage	J is an Integer ranging from 0 to 9. The units is V.
K	KK.K	Reserved	
l	JJ.J	Reserved	
M	KK.K	Reserved	
N	LL.L	Reserved	
O	O	Battery type	0: AGM 1: Flooded

P	P0	Max charging current it can be configured	P is an Integer ranging from 0 to 9 The units is A.
Q	Q0	Current max charging current	N is an Integer ranging from 0 to 9. The units is A.
O	O	Input voltage range	0: Appliance 1: UPS
P	P	Output source priority	0: Utility first 1: Solar first 2: SBU priority
Q	Q	Charger source priority	0: Utility first 1: Solar first 2: Solar + Utility
R	R	Reserved	
S	SS	Machine type	00: Grid tie; 01: Off Grid; 10: Hybrid.
T	T	Topology	0 transformerless 1 transformer

## 2.6 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
J	Enable/Disable power saving
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

Computer: QFLAG <CRC><cr>

Device: (ExxxDxxx <CRC><cr>

## 2.7 QPIGS<cr>: Device general status parameters inquiry

Computer: QPIGS <CRC><cr>

Device: (BBB.B CC.C DDD.D EE.E FFFF GGGG HHH III JJ.J KK OOO PPPP EEEE UUU.U  
WWW.W TTT.T b7b6b5b4b3b2b1b0 <CRC><cr>

	Data	Description	Notes
A	(	Start byte	

B	BBB.B	Grid voltage	B is an Integer number 0 to 9. The units is V.
C	CC.C	Grid frequency	C s an Integer number 0 to 9. The units is Hz.
D	DDD.D	AC output voltage	D is an Integer number 0 to 9. The units is V.
E	EE.E	AC output frequency	E is an Integer number from 0 to 9. The units is Hz.
F	FFFF	AC output apparent power	F is an Integer number from 0 to 9. The units is VA
G	GGGG	AC output active power	G is an Integer ranging from 0 to 9. The units is W.
H	HHH	Output load percent	DEVICE: HHH is Maximum of W% or VA%. VA% is a percent of apparent power. W% is a percent of active power. The units is %.
I	III	BUS voltage	I is an Integer ranging from 0 to 9. The units is V.
J	JJ.J	Battery voltage	J is an Integer ranging from 0 to 9. The units is V.
K	KK	Battery charging current	K is an Integer ranging from 0 to 9. The units is A.
O	OOO	Battery capacity	X is an Integer ranging from 0 to 9. The units is %.
P	PPPP	Reserved	
R	EEEE	Reserved	
T	UUU.U	Reserved	
U	WW.WW	Reserved	
W	TTT.T	Reserved	
X	b7b6b5b4 b3b2b1b0	Device status	b7: reserve b6: reserve b5: SCC firmware version 1: Updated 0: unchanged b4: Load status: 0: Load off 1:Load on b3: reserve b2: Charging status( Charging on/off) b1: Charging status( SCC charging on/off) b0: Charging status(AC charging on/off) b2b1b0: 000: Do nothing 110: Charging on with SCC charge on 101: Charging on with AC charge on 111: Charging on with SCC and AC charge on

## 2.8 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.

## 2.9 QPIWS<cr>: Device Warning Status inquiry

Computer: QPIWS<CRC> <cr>

Device: (a0a1.....a30a31<CRC><cr>

a0,...,a31 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
a0	Reserved	
a1	Inverter fault	Fault
a2	Bus Over	Fault
a3	Bus Under	Fault
a4	Bus Soft Fail	Fault
a5	LINE_FAIL	Warning
a6	OPVShort	Warning
a7	Inverter voltage too low	Fault
a8	Inverter voltage too high	Fault
a9	Over temperature	Fault
a10	Fan locked	Compile with a1, if a1=1,fault, otherwise warning

a11	Battery voltage high	Compile with a1, if a1=1,fault, otherwise warning
a12	Battery low alarm	Warning
a13	Reserved	
a14	Battery under shutdown	Warning
a15	Reserved	Warning
a16	Over load	Compile with a1, if a1=1,fault, otherwise warning
a17	Eeprom fault	Warning
a18	Reserved	
a19	Reserved	
a20	Reserved	
a21	Reserved	
.....	Reserved	
a30	Reserved	
a31	Reserved	

## 2.10 QDI<cr>: The default setting value information

Computer: QDI<CRC><cr>

Device: (BBB.B CC.C DDDD EE.E FF.F GG.G HH.H II J K L M N O P Q R S T U V W<CRC><cr>

	Data	Description	Notes	
A	(	Start byte		
B	BBB.B	AC output voltage	B is an Integer ranging from 0 to 9. The units is V.	Default 230.0
C	CC.C	AC output frequency	C is an Integer ranging from 0 to 9. The units is Hz.	Default 50.0
D	DDDD	Reserved for AC output parameter		Reserved
E	EE.E	Battery low alarm voltage		Reserved
F	FF.F	Battery under voltage		Reserved
G	GG.G	Charging bulk voltage		Reserved
H	HH.H	Battery default re-charge voltage	H is an Integer ranging from 0 to 9. The units is V.	11.5 for 1kVA and 23.0 for 2kVA/3kVA.
I	II	Max charging current	I is an Integer ranging from 0 to 9. The units is A.	Default 50



J	J	AC input voltage range	J is an Integer ranging from 0 to 1. No unit	Default <b>0</b> for appliance range
K	K	Output source priority	K is an Integer ranging from 0 to 1. No unit	Default 0 for utility first
L	L	Charger source priority	L is an Integer ranging from 0 to 1. No unit	Default 0 for Utility first
M	M	Battery type	M is an Integer ranging from 0 to 1. No unit	Default 0 for AGM
N	N	Enable/disable silence buzzer or open buzzer	N is an Integer ranging from 0 to 1. No unit	Default 0 for enable buzzer
O	O	Enable/Disable power saving	O is an Integer ranging from 0 to 1. No unit	Default 0 for disable power saving
P	P	Enable/Disable overload restart	P is an Integer ranging from 0 to 1. No unit	Default 0 for disable overload restart
Q	Q	Enable/Disable over temperature restart	Q is an Integer ranging from 0 to 1. No unit	Default 0 for disable over temperature restart
R	R	Enable/Disable LCD backlight on	R is an Integer ranging from 0 to 1. No unit	Default 1 for enable LCD backlight on
S	S	Enable/Disable alarm on when primary source interrupt	S is an Integer ranging from 0 to 1. No unit	Default 1 for enable alarm on when primary source interrupt
T	T	Enable/Disable fault code record	T is an Integer ranging from 0 to 1. No unit	Default 0 for disable fault code record
U	U			reserved
V	V			reserved
W	W			reserved

## 2.11 QMCHGCR<cr>: Enquiry max charging current range

Computer: QMCHGCR<CRC><cr>

Device: (LLL NNN<CRC><cr>

LLL/NNN is 2 integer number 0 to 9, LLL~NNN is the range of charging current;

## 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
J	Enable/Disable power saving
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

### 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	50A
4	AC input voltage range	0: Appliance range
5	Output source priority	0: Utility first
6	Charger source priority	0: Utility first
7	Battery type	0: AGM
8	Enable/disable buzzer alarm	1: Enable buzzer alarm
9	Enable/Disable power saving	0: Disable power saving
10	Enable/Disable overload restart	0: Disable overload restart
11	Enable/Disable over temperature restart	0: Disable over temperature restart
12	Enable/Disable LCD backlight on	1: Enable LCD backlight on
13	Enable/Disable alarm on when primary source interrupt	1: Enable beep on when primary source interrupt

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>

nnn is from 010 ~ 050

### 3.4 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

### 3.5 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

### 3.6 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

### 3.7 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

### 3.8 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

### 3.9 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

## 4 Appendix

### 4.1 CRC calibration method



CRC. c