Item	Time	content	editor

Change log

Num	Date	Version	FW version	Content	Mender
1	2014-3-24	1.00	0949-02G	Release	
2	2020-2-24	1.01	1378-08G	1. Remove power saving function 2. Remove AC output current R(addr:220)	Huangyong
3	2021.5.24	1.02	1378-10G	Add addr 1160,Query machine model	Huangyong

Protocol

1. Warning item

Hex	Dec	Size	Content	Bit value	type
0x0003	3	bit15	bit15-bit8 = Reservation	0:FALSE/1:TRUE	Read only
		bit6	bit6 = Inverter fault	0:FALSE/1:TRUE	Read only
		bit5	bit5 = Bus Over	0:FALSE/1:TRUE	Read only
		bit4	bit4 = Bus under	0:FALSE/1:TRUE	Read only
		bit3	bit3 = Bus soft fail	0:FALSE/1:TRUE	Read only
		bit2	bit2 = LINE_FAIL	0:FALSE/1:TRUE	Read only
		bit1	bit1 = OPVShort	0:FALSE/1:TRUE	Read only
		bit0	bit0 = Inverter voltage too low	0:FALSE/1:TRUE	Read only
0x0004	4	bit15	bit15 = Inverter voltage too high	0:FALSE/1:TRUE	Read only
		bit14	bit14 = Over temperature	0:FALSE/1:TRUE	Read only
		bit13	bit13 = Fan locked	0:FALSE/1:TRUE	Read only
		bit12	bit12 = Battery voltage high	0:FALSE/1:TRUE	Read only
		bit11	bit11 = Battery low alarm	0:FALSE/1:TRUE	Read only
		bit10	bit10 = Reserved	0:FALSE/1:TRUE	Read only
		bit9	bit9 = Battery under shutdown	0:FALSE/1:TRUE	Read only
		bit8	bit8 = Reserved	0:FALSE/1:TRUE	Read only
		bit7	bit7 = Over load	0:FALSE/1:TRUE	Read only
		bit6	bit6 = Eeprom fault	0:FALSE/1:TRUE	Read only
		bit5	bit5 = Inverter Over Current	0:FALSE/1:TRUE	Read only
		bit4	bit4 = Inverter Soft Fail	0:FALSE/1:TRUE	Read only
		bit3	bit3 = Self Test Fail	0:FALSE/1:TRUE	Read only
		bit2	bit2 = OP DC Voltage Over	0:FALSE/1:TRUE	Read only
		bit1	bit1 = Bat Open	0:FALSE/1:TRUE	Read only
		bit0	bit0 = Current Sensor Fail	0:FALSE/1:TRUE	Read only
0x0005	5	Bit15	Bit15 = Battery Short	0:FALSE/1:TRUE	Read only
			bit14 = Power limit	0:FALSE/1:TRUE	Read only
			bit13 = PV voltage high	0:FALSE/1:TRUE	Read only
			bit12 = MPPT overload fault	0:FALSE/1:TRUE	Read only
			bit11 = MPPT overload warning	0:FALSE/1:TRUE	Read only
			bit10 = Battery too low to charge	0:FALSE/1:TRUE	Read only
			bit9 = Reserved		
			bit8 = Reserved		
			Bit7-bit0 = Reservation		

2. Enable/Disable item

Hex	Dec	Size	Content	units	type
0x000E	14	bit15	bit15= Enable/disable silence buzzer or open buzzer	E:8000/D:7FFF	Read/Write

		bit14	bit14= Enable/Disable overload bypass function	E:4000/D:BFFF	Read/Write
			bit13-bit3= Reservation		
			bit1-bit0 = Reservation		

Hex	Dec	Size	Content	units	type
0x000F	15	bit15	~~bit15=Enable/Disable power saving~~	~~E:8000/D:7FFF~~	~~Read/Write~~
		bit14	bit14= Enable/Disable LCD display escape to default page after 1min timeout	E:4000/D:BFFF	Read/Write
			bit13= Reservation		
		bit12	bit12= Enable/Disable over temperature restart	E:1000/D:EFFF	Read/Write
			bit11= Reservation		
		bit10	bit10 = Enable/Disable overload restart	E:400/D:FBFF	Read/Write
		bit09	bit09= Enable/Disable backlight on	E:200/D:FDFF	Read/Write
		bit08	bit08= Enable/Disable alarm on when primary source interrupt	E:100/D:FEFF	Read/Write
		bit07	bit07= Enable/Disable fault code record	E:80/D:FF7F	Read/Write
			Bit06-bit00= Reservation		

3. Support Capability list

Hex	Dec	Size	Content	units	type
0x0010	16	bit15	Support: Enable/disable silence buzzer or open buzzer	0:FALSE/1:TRUE	Read Only
		bit14	Support: Enable/Disable overload bypass function	0:FALSE/1:TRUE	Read Only

Hex	Dec	Size	Content	units	type
0x0011	17	bit15	~~Support: Enable/Disable power saving~~	~~0:FALSE/1:TRUE~~	~~Read Only~~
		bit14	Support: Enable/Disable LCD display escape to default page after 1min timeout	0:FALSE/1:TRUE	Read Only
			bit13= Reservation		
		bit12	Support: Enable/Disable over temperature restart	0:FALSE/1:TRUE	Read Only
			bit11= Reservation		
		bit10	Support: Enable/Disable overload restart	0:FALSE/1:TRUE	Read Only
		bit09	Support: Enable/Disable backlight on	0:FALSE/1:TRUE	Read Only
		bit08	Support: Enable/Disable alarm on when primary source interrupt	0:FALSE/1:TRUE	Read Only
		bit07	Support: Enable/Disable fault code record	0:FALSE/1:TRUE	Read Only
			Bit06-bit00= Reservation		

5. Setting Parameter

0x0030	48	bit15	bit15 = Setting control parameter to default value	8000:FALSE/1:TRUE	Write
			bit14-bit8 = Reservation		
			bit 5-bit0 = Reservation		
0x003B	59	bit15	bit15 = Flag: Setting control parameter to default value	8000:FAIL/1:SUCCESS	Read
			b14-b0 = Reservation		

6. Working mode

0x00D0	208	1	Mode inquiry	Note2	Read Only

7. Working status

0x00D1	209	1	Grid voltage R	0.1V	Read Only
0x00D5	213	1	Grid frequency	0.1Hz	Read Only
0x00D8	216	1	AC output voltage R	0.1V	Read Only
0x00D9	217	2	AC output power R	w	Read Only
0x00DB	219	1	AC output R frequency	0.1Hz	Read Only
0x0185	389	2	AC output apparent power	VA	Read Only
0x00DD	221	1	AC output load percent	1%	Read Only
0x00DE	222	1	BUS voltage	V	Read Only
0x00E0	224	1	P battery voltage	0.01V	Read Only
0x00E2	226	1	Battery capacity	1%	Read Only
0x00E3	227	1	Charging current	0.1A	Read Only
0x00EA	234	1	PV1 Input voltage	0.1V	Read Only
0x00EB	235	1	PV2 Input voltage	0.1V	Read Only
0x00ED	237	1	Max Temperature of the detecting pointers	℃	Read Only
0x0121	289	1	PV2 input current	1A	Read Only
0x0127	295	1	PV1 input current	1A	Read Only
0x0128	296	1	battery voltage from SCC	0.01V	Read Only
0x0129	297	2	Battery discharge current	1A	Read Only
0x012B	299	1	Status	Note1	Read Only
0x030F	783	1	Battery voltage offset for fans on	0.01V	Read Only
0x0310	784	1	EEPROM version		Read Only
0x0311	785	1	PV1 Charging power	W	Read Only
0x031A	794	1	PV2 Charging power	W	Read Only

8. Parallel information

0x015E	350	1	Parallel index		Read/Write
0x015F	351	1	The parallel index whether exist	0: No exist. 1: Exist.	Read Only
0x0160	352	7	Serial number		Read Only
0x0167	359	1	Work mode	Note2	Read Only
0x0168	360	1	Fault code	Note14	Read Only
0x0169	361	1	Grid voltage	0.1V	Read Only
0x016A	362	1	Grid frequency	0.01Hz	Read Only
0x016B	363	1	AC output voltage	0.1V	Read Only
0x016C	364	1	AC output frequency	0.01Hz	Read Only
0x016D	365	2	AC output apparent power	W	Read Only
0x016F	367	2	AC output active power	W	Read Only
0x0171	369	1	Load percentage	%	Read Only
0x0172	370	1	Battery voltage	0.1V	Read Only
0x0173	371	1	Battery charging current	A	Read Only
0x0174	372	1	Battery capacity	%	Read Only
0x0175	373	1	PV input voltage	0.1V	Read Only
0x0176	374	1	Total charging current	A	Read Only
0x0177	375	2	Total AC output apparent power	VA	Read Only
0x0179	377	2	Total output active power	W	Read Only
0x017B	379	1	Total AC output percentage	%	Read Only
0x017C	380	1	Inverter Status	Note5	Read Only
0x017D	381	1	Output mode	Note4	Read Only
0x017E	382	1	Charger source priority	Note6	Read Only
0x017F	383	1	Max charger current	A	Read Only
0x0180	384	1	Max charger range	A	Read Only
0x0181	385	1	Max AC charge current	A	Read Only
0x0182	386	1	PV input current for battery	A	Read Only
0x0183	387	2	Battery discharge current	A	Read Only

9. Device model and rating information

0x03EB	1003	7	Serial number	ASCII	Read only
0x03F9	1017	2	Output rated VA	W	Read only
0x040D	1037	2	AC output rating active power	W	Read only
0x048E	1166	1	Parallel max num		Read only
0x048F	1167	1	Grid rating voltage	0.1V	Read only
0x0491	1169	1	Grid rating current	0.1A	Read only
0x0492	1170	1	AC output rating frequency	0.1Hz	Read only
0x0493	1171	1	AC output rating voltage	0.1V	Read only
0x0494	1172	1	AC output rating current	0.1A	Read only
0x0498	1176	1	Battery rating voltage	0.1V	Read only
0x049A	1178	1	Machine type	Note10	Read only
0x049B	1179	1	Topology	Note11	Read only

10. CPU information

0x03E0	992	1	Protocol ID Inquiry	ASCII	Read only
0x03E1	993	10	Main CPU Firmware version	ASCII	Read only
0x03E1	1160	2	Query machine model	ASCII	Read only
0x049C	1180	4	CPU 2 Firmware version inquiry	ASCII	Read only

11. Charging range information

0x05B0	1456	1	Setting or read max float charging voltage	0.1V	Read/Write
0x05B1	1457	1	Setting or read max charging current	1A	Read/Write
0x05C4	1476	1	Setting or read AC max charging current	1A	Read/Write
0x05C5	1477	1	Setting battery under voltage	0.1V	Read/Write
0x05C6	1478	1	Setting battery type	Note7	Read/Write
0x05C7	1479	1	Output source priority	Note8	Read/Write
0x05C8	1480	1	Charger source priority	Note6	Read/Write
0x05C9	1481	1	Output mode	Note4	Read/Write
0x05CA	1482	1	Battery re-charge voltage	0.1V	Read/Write
0x05CB	1483	1	Input voltage range	Note9	Read/Write
0x05CC	1484	1	PV OK condition for parallel	Note12	Read/Write
0x05CD	1485	1	PV power balance	Note13	Read/Write
0x05CD	1486	1	Battery re-discharge voltage	0.1V	Read/Write
0x05D5	1493	1	Setting or read Bulk charging voltage	0.1V	Read/Write

12. Default information

0x04A0	1184	1	AC output voltage	0.1V	Read only
0x04A1	1185	1	AC output frequency	0.1Hz	Read only
0x04A2	1186	1	Max AC charge current	1A	Read only
0x04A3	1187	1	Battery under voltage	0.1V	Read only
0x04A4	1188	1	Charging float voltage	0.1V	Read only

0x04A5	1189	1	Charging bulk voltage	0.1V	Read only
0x04A6	1190	1	Battery default re-charging voltage	0.1V	Read only
0x04A7	1191	1	Max charging current	1A	Read only
0x04A8	1192	1	AC input voltage range	Note9	Read only
0x04A9	1193	1	Output source priority	Note8	Read only
0x04AA	1194	1	Charger source priority	Note6	Read only
0x04AB	1195	1	Battery type	Note7	Read only
0x04AC	1196	1	PV power balance	Note13	Read only
0x04B0	1200	1	Output mode	Note4	Read only
0x04B1	1201	1	Battery re-charging voltage	0.1V	Read only
0x04B2	1202	1	PV OK condition for parallel	Note12	Read only

13. Change inverter rating frequency

Hex	Dec	Size	Content	units	type
0x0522	1314	bit15	bit15=Set device output rating frequency to 50Hz	E:8000/D:7FFF	Read/Write
		bit14	bit14=Set device output rating frequency to 60Hz	E:4000/D:BFFF	Read/Write
			bit13-bit0= Reservation		

14. Charging current table

0x012C	300	25	selectable value about max charging current	ASCII	Read only
0x0145	325	25	selectable value about max utility charging current	ASCII	Read only
0x054E	1358	25	selectable value about max utility charging current	ASCII	Read only

NOTE: If the data length at address 325 exceeds 50, put the excess to address 1358

1. Note1

Address	Bit	Value	Remarks
0x012BH	Bit15	1 or 0	add SBU priority version, 1:yes,0:no
	Bit14	1 or 0	configuration status: 1: Change 0: unchanged
	Bit13	1 or 0	SCC firmware version 1: Updated 0: unchanged
	Bit12	1 or 0	Load status: 0: Load off 1:Load on
	Bit11	1 or 0	battery voltage to steady while charging
	Bit10-Bit8		b10b10b8: 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
0x012BL	Bit15	1 or 0	flag for charging to floating mode
	Bit14	1 or 0	Switch On
	Bit13	1 or 0	reserved

2. Note2

Note 2:		
0x00D0H	0x50	Power on mode
	0x53	Standby mode
	0x4C	Line mode
	0x42	Battery mode
	0x46	Fault mode
	0x48	Power saving mode

3. Note3

Note3 explain	Fault Number(ASCII)	Fault Name
From here the error is the machine what is going on	‘0’ ‘0’	No error
	‘0’ ‘1’	Bus over voltage
	‘0’ ‘2’	Bus under voltage
	‘0’ ‘3’	Bus soft start time out
	‘0’ ‘4’	Inverter soft start time out
	‘0’ ‘5’	Inverter short
	‘0’ ‘6’	Over temperature
	‘0’ ‘7’	Relay fault
	‘0’ ‘8’	DC current sensor fail
	‘0’ ‘9’	PV high voltage
	‘1’ ‘0’	Power down
	‘1’ ‘1’	PV input short
	‘1’ ‘2’	GFCI over
	‘1’ ‘3’	PV isolation low
	‘1’ ‘4’	Inverter DC current over
	‘1’ ‘5’	Line value consistent fail between MCU & DSP
	‘1’ ‘6’	GFCI sensor fail
	‘1’ ‘7’	Connect fail between MCU & DSP
	‘1’ ‘8’	Communication fail between MCU & DSP
	‘1’ ‘9’	Ground loss
	‘2’ ‘0’	Discharge fail
	‘2’ ‘1’	Discharge Soft Time Out
	‘2’ ‘2’	Battery over charge
	‘2’ ‘3’	Over load
	‘2’ ‘4’	Battery open
	‘2’ ‘5’	Inverter over current for long time
	‘2’ ‘6’	Inverter short
	‘2’ ‘7’	Fan failure

4. Note4 Output mode

	Value	Remarks
output mode	0x00	single machine output
	0x01	parallel output
	0x02	Phase 1 of 3 Phase output

	0x03	Phase 2 of 3 Phase output
	0x04	Phase 3 of 3 Phase output

5. Note5

Address	Bit	Value	Remarks
	Bit15	1 or 0	1 SCC OK 0 SCC LOSS
	Bit14	1 or 0	1 AC Charging 0 AC no charging
	Bit13	1 or 0	1 SCC Charging 0 SCC no charging
	Bit12-11	1 or 0	10 battery open, 01 battery under, 00 battery normal
	Bit10	1 or 0	1 Line loss 0 Line ok
	Bit09	1 or 0	1 load on, 0 load off
	Bit08	1 or 0	configuration status: 1: Change 0: unchanged

6. Note6 charger source priority

	Value	Remarks
charger source priority	0x00	Utility first
	0x01	Solar first
	0x02	Solar + Utility
	0x03	Solar only

7. Note7 battery type

	Value	Remarks
battery type	0x00	AGM
	0x01	Flooded
	0x02	User

8. Note8 output source priority

	Value	Remarks
Output source priority	0x00	Utility first
	0x01	Solar first
	0x02	SBU first

9. Note9 input voltage range

	Value	Remarks
Input voltage range	0x00	Appliance
	0x01	UPS

10. Note10 machine type

Address	Value(ASCII)	Remarks
0x049AH	'0' '0'	Grid tie
	'0' '1'	Off Grid
	'1' '0'	Hybrid

11. Note11 topology type

	Value	Remarks
topology type	0	transformerless
	1	transformer

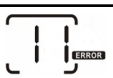
12. Note12 PV OK condition for parallel

	Value	Remarks
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, parallel system will consider PV OK

13. Note13 PV power balance

	Value	Remarks
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

14. Note14 fault code

Fault Code	Fault Event	Icon on
01	Fan is locked	
02	Over temperature	
03	Battery voltage is too high	
04	Battery voltage is too low	
05	Output short circuited or Over temperature	
06	Output voltage is too high	
07	Over load time out	
08	Bus voltage is too high	
09	Bus soft start failed	
11	Main relay failed	
51	Over current inverter	
52	Bus soft start failed	
53	Inverter soft start failed	
54	Self-test failed	
55	Over DC voltage on output of inverter	
56	Battery connection is open	
57	Current sensor failed	
58	Output voltage is too low	
60	Inverter negative power	
71	Parallel version different	
72	Output circuit failed	
80	CAN communication failed	
81	Parallel host line lost	
82	Parallel synchronized signal lost	

83	Parallel battery voltage detect different	
84	Parallel Line voltage or frequency detect different	
85	Parallel Line input current unbalanced	
86	Parallel output setting different	

Application example

1. Audible alarm Enable or Disable

Look for Enable audible alarm, It in table address 0x000E bit15.Then you may write 0x8000 to 0x000E to Enable audible alarm or write 0xEFFF to 0x0E to disable audible alarm.

For example:

[XX 10 00 0E 00 01 02 80 00 CRCL CRCH]Mean: Enable audible alarm.

[XX 10 00 0E 00 01 02 7F FF CRCL CRCH]Mean: Disable audible alarm.

Inquire the result of execute, you may read the follow address 0x10 bit15.

For example:

[XX 03 00 10 00 01 CRCL CRCH]

[XX 03 02 80 00 CRCL CRCH]Mean: Execute success

[XX 03 02 00 00 CRCL CRCH]Mean: Execute fail

2. Remote turn on

Look for silence buzzer beep in address 0x001A bit 11 。Then you may write 0x0800 to 0x001A.

For example:

[XX 10 00 1A 00 01 02 08 00 CRCL CRCH] Remote turn on.

Inquire the execution result. You may read 0x0025

[XX 03 00 25 00 01 CRCL CRCH] to inquire the results of command.

3. Setting control parameter to default value

Look for setting control parameter to default value it ,then write 0x8000 to 0x0030.If execute success then set 0x003B bit15 to 1;

For example:

[XX 10 00 30 00 01 02 80 00 CRCL CRCH]Setting control parameter to default value.

[XX 03 00 3B 00 01 CRCL CRCH]to inquire the results of command.

4. Get Grid voltage

Look for input voltage in address 0x00D1, when read 0x00D1 to get input voltage and it units is 0.1V

For example:

PC:[XX 03 00 D1 00 01 CRCL CRH]

DEVICE:[XX 03 02 00 E6 CRCL CRCH]

Mean: HEX [0x00E6] to DEC[230] .Gridvoltage:230V.

5. Setting Parameter item

Set The bypass Voltage high loss point, You want to Set the value 286V. Then write 0x011E to 0x0350.

For example:

PC:[XX 10 03 50 00 01 02 01 1E CRCL CRCH]

Mean: Set The bypass Voltage high loss point for 286V.