

Modbus Protocol for P16

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1. Warning item

Hex	Dec	Size	Content	Bit value	type
0x0003	3	bit15	bit15-bit7 = Reservation	0:FALSE/1:TRUE	Read only
		bit6	bit6 = Auto adjust processing	0:FALSE/1:TRUE	Read only
		bit5	bit5 = External flash fail	0:FALSE/1:TRUE	Read only
		bit4	bit4 = PV loss	0:FALSE/1:TRUE	Read only
		bit3	bit3 = PV low	0:FALSE/1:TRUE	Read only
		bit2	bit2 = Islanding detect	0:FALSE/1:TRUE	Read only
		bit1	bit1 = Initial fail	0:FALSE/1:TRUE	Read only
		bit0	bit0 = Grid voltage high loss	0:FALSE/1:TRUE	Read only
0x0004	4	bit15	bit15 = Grid voltage low loss	0:FALSE/1:TRUE	Read only
		bit14	bit14 = Grid frequency high loss	0:FALSE/1:TRUE	Read only
		bit13	bit13 = Grid frequency low loss	0:FALSE/1:TRUE	Read only
		bit12	bit12 = Feeding average voltage over	0:FALSE/1:TRUE	Read only
		bit11	bit11 = Negative Power	0:FALSE/1:TRUE	Read only
		bit10	bit10 = Grid fault	0:FALSE/1:TRUE	Read only
		bit9	bit9 = Battery under	0:FALSE/1:TRUE	Read only
		bit8	bit8 = Battery low	0:FALSE/1:TRUE	Read only
		bit7	bit7 = Battery open	0:FALSE/1:TRUE	Read only
		bit6	bit6 = Battery discharge low	0:FALSE/1:TRUE	Read only
		bit5	bit5 = Over load	0:FALSE/1:TRUE	Read only
		bit4	bit4 = Reservation		
		bit3	bit3 = PV1Loss	0:FALSE/1:TRUE	Read only
		bit2	bit2 = PV2Loss	0:FALSE/1:TRUE	Read only
		bit1	bit1 = Over temperature	0:FALSE/1:TRUE	Read only
		bit0	bit0 = Landlines missed	0:FALSE/1:TRUE	Read only
0x0005	5	Bit15	Bit15 = fan failure	0:FALSE/1:TRUE	Read only
			Bit14-bit0 = Reservation		

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2. Enable/Disable item

Hex	Dec	Size	Content	units	type
0x000E	14	bit15	bit15=Enable/disable audible alarm	E:8000/D:7FFF	Read/Write
		bit14	bit14=Enable/disable battery mode audible warning	E:4000/D:BFFF	Read/Write
			bit13-bit3= Reservation		
		Bit7	Wide AC input enable	E:0080/D:FF7F	Read/Write
		bit2	bit2=Enable/disable standby mode audible warning	E:4/D:FFFB	Read/Write
			bit1-bit0 =.Reservation		

Hex	Dec	Size	Content	units	type
0x0012	18	bit15	bit15=Enable/Disable battery charging by grid	E:8000/D:7FFF	Read/Write
		bit14	bit14=Enable/Disable battery charging by PV	E:4000/D:BFFF	Read/Write
		bit13	bit13= Enable/Disable the battery discharging to the grid	E:2000/D:DFFF	Read/Write
			bit12-bit0= Reservation		

3. Control item

0x001A	26		bit15-bit13= Reservation		
		bit12	bit12= Remote turn off	0:FALSE/1:TRUE	Read/Write
		bit11	bit11= Remote turn on	0:FALSE/1:TRUE	Read/Write
			bit10-bit0 = Reservation		

4. The result of control

Hex	Dec	Size	Content	Bit value	Type
0x0025	37		bit15-bit13= Reservation		
		bit12	bit12 = Remote turn off	0:FAIL/1:SUCCESS	Read Only
		bit11	bit11 = Remote turn on	0:FAIL/1:SUCCESS	Read Only
			bit10-bit0 = Reservation		

5. Setting Parameter to default value

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

6. Working mode

0x00D0	208	1	Mode inquiry	Note2	Read Only
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0x0122	290	1	Device Mode	Note4	Read Only
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7. Working status

0x00D1	209	1	Grid voltage R	0.1V	Read Only
0x00D2	210	3	Grid power R	w	Read Only
0x00D5	213	1	Grid frequency	0.1Hz	Read Only
0x00D6	214	2	Grid current R	0.1A	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
0x00DC	220	1	AC output current R	0.1A	Read Only
0x00DD	221	1	AC output load percent	1%	Read Only
0x00E0	224	1	P battery voltage	0.1V	Read Only
0x00E2	226	1	Battery capacity	1%	Read Only
0x00E3	227	1	Charging current	0.1A	Read Only
0x00E4	228	2	PV1 Input power	w	Read Only
0x00E6	230	2	Inverter output power(PV2 Input Power)	w	Read Only
0x00EA	234	1	PV1 Input voltage	0.1V	Read Only
0x00ED	237	1	Max Temperature of the detecting pointers	0.1℃	Read Only
0x00EE	238	1	PV status	Note1	Read Only
0x05D5	1493	1	Bulk charging voltage	0.1V	Read Only

8. Time information

0x0113	275	7	Time	ASCII (YYYYMMDDHHMMSS)	Read Only
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9. Generated energy inquiry (look for Application example 7)

0x0197	407	2	Total energy	KwH	Read Only
0x0199	409	2	Total energy an the hour	Wh	Read Only
0x019B	411	2	Total energy in the day	Wh	Read Only
0x019D	413	2	Total energy in the month	Wh	Read Only

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0x019F	415	2	Total energy in the year	Wh	Read Only
0x01C0	448	5	The date of the hourly energy	ASCII	Read/Write
0x01C5	453	4	The date of the daily energy	ASCII	Read/Write
0x01C9	457	3	The date of the monthly energy	ASCII	Read/Write
0x01CC	460	2	The date of the yearly energy	ASCII	Read/Write
0x04B3	1203	5	The time when the user fist storage capacity	ASCII	Read Only

10. Fault information (look for Application example 6)

0x02A3	675	1	Fault kind	Note3	Read Only
0x02A4	676	1	Fault ID	Note5	Read Only
0x035B	859	1	Write the fault ID that you want		Read Only
0x02AF	687	1	History Fault kind	Note6	Read Only
0x02B0	688	7	History Fault Time	ASCII (YYYYMMDDHHMMSS)	Read Only
0x02B7	695	1	PV1 input voltage before fault	0.1V	Read Only
0x02B8	696	1	PV1 current before fault	0.1A	Read Only
0x02B9	697	1	Reserved	0.1V	Read Only
0x02BA	698	1	Reserved	0.1V	Read Only
0x02BD	701	1	Inverter R Volt before fault	0.1℃	Read Only
0x02BE	702	1	Inverter R current before fault	0.1A	Read Only
0x02BF	703	1	Grid R voltage before fault	0.1V	Read Only
0x02C0	704	1	Grid R Freq before fault	0.1Hz	Read Only
0x02C1	705	2	Grid R current before fault	0.1A	Read Only
0x02C8	712	1	Max Temperature before fault	0.1℃	Read Only

11. Loss point

0x034E	846	1	The grid input Freq high loss point	0.1Hz	Read/Write
0x034F	847	1	The grid input Freq low loss point	0.1Hz	Read/Write
0x0350	848	1	The grid input Voltage high loss point	0.1V	Read/Write
0x0351	849	1	The grid input Voltage low loss point	0.1V	Read/Write
0x0352	850	1	The feeding voltage high loss point	0.1V	Read/Write
0x0353	851	1	The feeding voltage low loss point	0.1V	Read/Write
0x0354	852	1	The feeding freq high loss point	0.1Hz	Read/Write
0x0355	853	1	The feeding freq low loss point	0.1Hz	Read/Write
0x05CC	1484	1	The grid long time average voltage high loss point	0.1V	Read/Write

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12. CPU information

0x03E0	992	1	Protocol ID Inquiry	ASCII	Read only
0x03E1	993	10	Main CPU Firmware version	ASCII	Read only

13. Output power

0x040D	1037	2	The lower limit of output power	W	Read/Write
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14. The range of input voltage

0x040F	1039	1	The lower limit of input voltage	V	Read/Write
0x0410	1040	1	The upper limit of input voltage	V	Read/Write

15. LCD sleep time

0x0411	1041	1	The LCD sleep time inquiry or set	unit is 30s	Read/Write
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16. Charging range information

0x0318	792	1	Setting or read battery Max. discharged current in hybrid mode	A	Read/Write
0x0361	865	1	Setting or read Max. AC charging current	A	Read/Write
0x05B0	1456	1	Setting or read max charging voltage	0.1V	Read/Write
0x05B1	1457	1	Setting or read max charging current	0.1A	Read/Write

17. MPPT information

0x05CD	1485	1	PV input high voltage for MPPT	0.1V	Read/Write
0x05CE	1486	1	PV input low voltage for MPPT	0.1A	Read/Write

18. Default information

0x04A0	1184	1	Grid output voltage high loss point	0.1V	Read only
0x04A1	1185	1	Grid output voltage low loss point	0.1V	Read only
0x04A2	1186	1	Grid output frequency high loss point	0.1Hz	Read only
0x04A3	1187	1	Grid output frequency low loss point	0.1Hz	Read only
0x04A4	1188	1	Grid input voltage high loss point	0.1V	Read only
0x04A5	1189	1	Grid input voltage low loss point	0.1V	Read only
0x04A6	1190	1	Grid input frequency high loss point	0.1Hz	Read only
0x04A7	1191	1	Grid input frequency low loss point	0.1Hz	Read only
0x04A8	1192	1	The upper limit of PV input voltage	V	Read only
0x04A9	1193	1	The lower limit of PV input voltage	V	Read only
0x04AA	1194	1	The PV input high voltage for MPPT	V	Read only
0x04AB	1195	1	The PV input low voltage for MPPT	V	Read only

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0x04AC	1196	2	Max output power	w	Read only
0x04AE	1198	1	Long time grid average voltage high loss point	V	Read only
0x04AF	1199	1	LCD sleep time	ASCII(S)	Read only
0x04B0	1200	1	Battery piece number		Read only
0x04B1	1201	1	Reserved		
0x04B2	1202	1	Reserved		
0x04BE	1214	1	MAX Charger current	0.1A	Read only
0x04BF	1215	1	MAX Charging Volt	0.1V	Read only
0x04C0	1216	1	The Rating feeding grid wait time	s	Read only

19. Feeding wait time

0x0358	856	1	The feeding wait time	S (ASCII)	Read/Write
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20. Setting range information

0x04C1	1217	1	The upper limit of grid output voltage high loss point	0.1V	Read only
0x04C2	1218	1	The lower limit of grid output voltage high loss point	0.1V	Read only
0x04C3	1219	1	The upper limit of grid output voltage low loss point	0.1V	Read only
0x04C4	1220	1	The lower limit of grid output voltage low loss point	0.1V	Read only
0x04C5	1221	1	The upper limit of grid output frequency high loss point	0.1Hz	Read only
0x04C6	1222	1	The lower limit of grid output frequency high loss point	0.1Hz	Read only
0x04C7	1223	1	The upper limit of grid output frequency low loss point	0.1Hz	Read only
0x04C8	1224	1	The lower limit of grid output frequency low loss point	0.1Hz	Read only
0x04C9	1225	1	The upper limit of waiting time for feeding	s	Read only
0x04CA	1226	1	The lower limit of waiting time for feeding	s	Read only
0x04CB	1227	1	The upper limit of floating charging voltage	0.1V	Read only
0x04CC	1228	1	The lower limit of floating charging voltage	0.1V	Read only
0x04CD	1229	1	The upper limit of max charging current	0.1A	Read only
0x04CE	1230	1	The lower limit of max charging current	0.1A	Read only
0x04CF	1231	1	The upper limit of max PV input voltage	1V	Read only
0x04D0	1232	1	The lower limit of max PV input voltage	1V	Read only
0x04D1	1233	1	The upper limit of min PV input voltage	1V	Read only
0x04D2	1234	1	The lower limit of min PV input voltage	1V	Read only

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0x04D3	1235	1	The upper limit of max MPPT voltage	1V	Read only
0x04D4	1236	1	The lower limit of max MPPT voltage	1V	Read only
0x04D5	1237	1	The upper limit of min MPPT voltage	1V	Read only
0x04D6	1238	1	The lower limit of min MPPT voltage	1V	Read only
0x04D7	1239	1	The upper limit of max charging voltage	0.1V	Read only
0x04D8	1240	1	The lower limit of max charging voltage	0.1V	Read only
0x04D9	1241	2	The upper limit of max output power	1W	Read only
0x04DB	1243	2	The lower limit of max output power	1W	Read only

21. PV model and rating information

0x03EB	1003	7	Main Production type	ASCII	Read only
			Sub Production type	ASCII	Read only
			VA type	ASCII	Read only
			H/LV type	ASCII	Read only
			Year	ASCII	Read only
			Month	ASCII	Read only
			Manufacturer ID	ASCII	Read only
			Serial number	ASCII	Read only
0x03F2	1010	1	Battery Piece Number		Read only
0x03F3	1011	1	Battery standard voltage per unit	0.1V	Read only
0x03F4	1012	1	Input phase		Read only
0x03F5	1013	1	Output phase		Read only
0x03F6	1014	1	Nominal I/P Voltage	V	Read only
0x03F7	1015	1	Nominal O/P Voltage	V	Read only
0x03F8	1016	1	Output power factor		Read only
0x03F9	1017	2	Output rated VA	W	Read only
0x03FB	1019	8	Device model	ASCII	Read only
0x048F	1167	1	Grid rating voltage	0.1V	Read only
0x0490	1168	1	Grid rating frequency	0.1A	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
0x0497	1175	1	MPPT rating current	0.1A	Read only
0x0498	1176	1	Battery rating voltage	0.1V	Read only
0x049A	1178	1	Machine type	Note7	Read only
0x04DE	1246	1	battery cut-off discharging voltage when Grid is unavailable	0.1V	Read/Write
0x05D5	1493	1	Setting bulk charging voltage	0.1V	Read/Write
0x05B0	1456	1	Setting floating charging voltage	0.1V	Read/Write
0x05BC	1468	1	Battery stop discharge percentage when grid is	1%	Read/Write

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			unavailable		
0x05BD	1469	1	Battery stop discharge percentage when grid is available	1%	Read/Write
0x05BE	1470	1	Battery re-discharge percentage when grid is unavailable	1%	Read
0x05BF	1471	1	Battery re-discharge percentage when grid is available	1%	Read

22. Inquiry and Setting grid power adjustment

04F0	1264	1	grid power adjustment	W	Read/Write
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Note

1. Note1

Address	Bit	Value	Remarks
0x00EEh	Bit15-Bit12		Reserved
	Bit11	1 or 0	0: Load off 1: Load on
	Bit10-Bit9	00 or 01 or 10	Battery status (00: Do nothing 01: Charging 10: Discharging)
	Bit8	1 or 0	0: DC-AC 1: AC-DC
	Bit7-Bit2		Reserved
	Bit1-Bit0	00 or 01 or 10	Line direction (00: means unsteady 01: means Line input 10: means Line output)

2. Note2

Note 2:		
0x00D0H	P:	Power on mode
	S:	Standby mode
	Y:	Bypass mode
	L:	Line mode
	B:	Battery mode
	T:	Battery test mode
	F:	Fault mode
	G:	Grid mode
	C:	Change mode

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	D:	Shutdown mode
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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

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	'2' '7'	Fan failure
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4. Note4

Address	Value(ASCII)	Remarks
0x0122H	'0' '1'	Power on mode
	'0' '2'	Grid-tie with backup mode
	'0' '3'	Inverter Mode
	'0' '4'	Bypass Mode with PV Charging
	'0' '5'	Bypass Mode with AC Charging
	'0' '6'	Bypass mode without charging
	'0' '7'	Standby mode with PV charging
	'0' '8'	Standby mode with AC charging
	'0' '9'	Standby mode without charging

5. Note5

Address	Value(ASCII)	Remarks
0x0122H	0x00	the latest fault ID is 0, only ID 0 could read out fault
	0x01	the latest fault ID is 1, Both ID0 and ID1 could read out fault
	0x02	the latest fault ID is 2
	0x03	the latest fault ID is 3
	0x04	the latest fault ID is 4
	0x05	the latest fault ID is 5
	0x06	the latest fault ID is 6
	0x07	the latest fault ID is 7
	0x08	the latest fault ID is 8

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6. Note6

Note3 explain	Fault Number(ASCII)	Fault Name
Read the history error of machine from here	'0' '0'	There is no error at this fault ID
	'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

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7. Note7

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

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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]

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

6. Read the history error

When you want to read the error which fault id is 1. Then write 0x0001 to 0x035B.

For example:

PC:[XX 10 03 5B 00 01 02 00 01 CRCL CRCH]

Mean: Set The fault ID for 1 that mean you want read the error information of ID 1.

After that action please wait one second. Then you can read the error information of this fault ID from the address of 0x02AF to 0x02C9.

For example:

PC:[XX 03 02 AF 00 01 CRCL CRH]

DEVICE:[XX 03 02 31 32 CRCL CRCH]

Mean: HEX [0x31] and [0x32] to ASCII '1' and '2', 12 fault

If DEVICE:[XX 03 02 46 46 CRCL CRCH]

Mean: HEX [0x46] and [0x46] to ASCII 'F' and 'F', means read failed. Please operate again.

If DEVICE:[XX 03 02 45 45 CRCL CRCH]

Mean: HEX [0x45]and[0x45] to ASCII 'E' and 'E', means now is reading. Please wait.

7. Read the energy generated of the history

When you want to read the energy of the 2011 years . Then write 0x32 0x30 0x31 0x31 to 0x01CC.

For example:

PC:[XX 10 01 CC 00 02 04 32 30 31 31 CRCL CRCH]

Mean: Set 0x01CC for 2011 that mean you want read the energy of 2011.

After that action please wait one second. Then you can read the energy of this year from the address of 0x019F.

For example:

PC:[XX 03 01 9F 00 02 CRCL CRCH]

DEVICE:[XX 03 04 00 00 75 30 CRCL CRCH]

Mean: HEX [0x00007530]to DEC[30000] energy is 30000W

If DEVICE:[XX 03 04 FF FF FF FF CRCL CRCH]

Mean: HEX [0xFFFFFFFF] means read failed. Please write operate again.

If DEVICE:[XX 03 04 FE FF FF FF CRCL CRCH]

Mean: HEX [0xFEFFFFFF] means now is reading. Please wait.