Modbus Protocol of Inverter

HT Series Internal V1.4

Content

Version record				
Version	**Date**	**Author**	**Remark**	**Software version**
V1.0	2023.02.08	Frank	1. Original	
V1.1	2023.03.01	Frank	1. Revise remark information of 41481	
V1.2	2024.02.06	Song.liu	1. CRC sequence update 2. Table8-2 & Table8-3 remark information update 3. Example update	HT 1100V DSP : V1.17.17 ARM : V1.15 HT 1500V DSP: V1.15.15 ARM: V1.15
V1.3	2024.02.26	Aqiang.xu	1. Some address added	HT 1100V DSP : V1.18.18 ARM : V1.15 HT 1500V DSP: V1.16.16 ARM: V1.15
V1.4	2024.6.11	Qingjie Yang	1. Some mistake corrected. 42441, 0:off, 1: on 42442, 0:off, 1: on	-

This MODBUS RTU protocol applies to the communication between GoodWe grid-connected inverters – HT series (including 73kW/100kW/110kW/136kW/225kW/250kW) and the monitoring device. The protocol can used to read real-time operating data and fault status of the inverter, and to perform remote control.

1. Byte Format

Serial Data Transmission
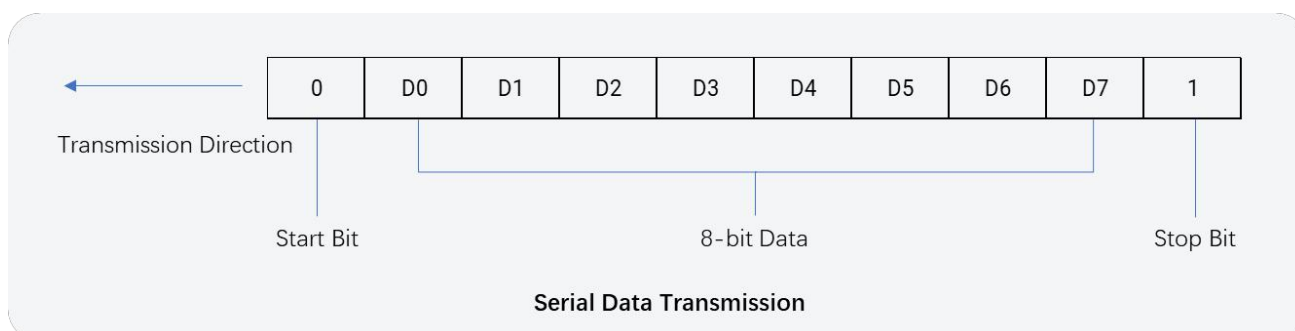
A byte is of 8 binary digits working together with 1 start bit (0) and 1 stop bit (1) in transmission, 10 bits in total. As illustrated below, D0 is the least significant bit (LSB) and D7 is the most significant bit (MSB). After the start bit, the 8 bits of the byte are sent starting with the least significant bit.

2. Communication data format

Data are exchanged in the form of word or doubleword

Data type	**Register Size**	**Byte Size**	**Remark**

Byte Data	1	1	
Integer Data	1	2	One forwarding at one time, from the most significant bit to the least significant bit.
Long Integer Data			Two separate forwarding, from the most significant bit to the least significant bit.
Floating-point Dat	2	4	

3. Frame Format

3.1 Read the content of Register (Function Code 03H)

3.1.1 Frame format from host device

No	Code	Example	Remark
1	Device Address	1	The device's communication address range 1-247 DEC
2	03H	03H	Function code
3	MSB of First Register	00H	The address of first register
4	LSB of First Register	01H	
5	MSB of Register Number	00H	Register number
6	LSB of register Number	02H	
7	CRC16 MSB of Checksum	95H	CRC Checksum Data Check mode: None
8	CRC16 LSB of Checksum	CBH	

3.1.2 Frame format by device (normal data)

No	Code	Remark
1	Device Address	The device's communication address range (1-247DEC)
2	03H	Function code
3	Byte Number of Receiving Data (2N)	Number of data
4	MSB of First Register Data	MSB of First Register Data
5	LSB of First Register Data	LSB of First Register Data
……	……	……
2N+2	MSB of Register Data N	MSB of Register Data N
2N+3	LSB of Register Data N	LSB of Register Data N
2N+4	CRC16 MSB of Checksum	CRC16 MSB of Checksum
2N+5	CRC16 LSB of Checksum	CRC16 LSB of Checksum

3.1.3 Frame format by device (error of first register address or number)

No	Code	Remark
1	Device Address	The device's communication address range (1-247DEC)
2	83H	Function code
3	02H	Error Code
4	CRC16 MSB of Checksum	High bit of checksum
5	CRC16 LSB of Checksum	Low bit of checksum

3.2 Set the Content of Register (Function code 10H)
3.2.1   Frame format from host device

No	Code	Example	Remark
1	Device Address	1	The device's communication address range (1-247DEC)
2	10H	10H	Function code
3	MSB of Register Data N	00H	Address of Register 0000H
4	LSB of Register Data N	00H	
5	MSB of Register Number	00H	Byte Number of Register 01H
6	LSB of Register Number	01H	
7	Byte Number (N)	02H	Byte Number of Register 02H

8	MSB of Data	0AH	Data 0AF0H
9	LSB of Data	F0H	
10	CRC16 MSB of Checksum	A0H	CRC Checksum
11	CRC16 LSB of Checksum	B4H	

3.2.2 Frame format by device (write successful)

No	Code	Examp	Remark
1	Device Address	1	The device's communication address range (1-247DEC)
2	10H	10H	Function code
3	MSB of Register Data N	00H	Address of Register 0000H
4	LSB of Register Data N	00H	
5	MSB of Register Number	00H	Byte Number of Register 01H
6	LSB of Register Number	01H	
7	CRC16 MSB of Checksum	01H	CRC Checksum
8	CRC16 LSB of Checksum	C9H	

3.2.3 Frame format by device (data error)

No	Code	Remark
1	Device Address	The device's communication address range (1-247DEC)
2	90H	Function code
3	03H	Error code
4	CRC16 MSB of Checksum	CRC Checksum
5	CRC16 LSB of Checksum	

3.2.4 Frame format by device (error of register address or number)

No	Code	Remark
1	Device Address	The device's communication address range (1-247DEC)
2	90H	Function code
3	02H	Error code
4	CRC16 MSB of Checksum	CRC Checksum
5	CRC16 LSB of Checksum	

4. Baud Rate of Communication

9600bps

5. Device Address

The range of device address is 1-247 with 247 as default setting before delivery. You may set the

address on site via Solargo accordingly.

6. Function Code

03H: read (Note: support the function of read of one or more consecutive addresses)
10H: write (Note: RTC times can only be written together)

7. CRC Checking of Communication

The CRC check starts with the first byte and ends with the byte before the CRC check high byte.
Checking mode: None

8. Register Address of Device

Table   8-1:Modbus address

Address Decimal (十进制)	Hexadecimal (十六进制)	English Name 英文名称	Chinese Name中文名称	#R/W 读写	#Type 类型	#Length长度	#SF Gain 增益	#Units 单位1	Range 范围	Note 备注
32002	7D02	Operating status	运行状态	RO	U16	1	1	N/A	[0,0]	0: Standby mode 1: In operation 2: Fault 3: off 4: self-checking 5:Updating 6:Night
32016	7D10	PV1 Voltage	PV1电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt1 For HTN series, str1/mppt1 Please refer to table 8-2
32017	7D11	PV1 Current	PV1 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt1 For HTN series, str1/mppt1 Please refer to table 8-2
32018	7D12	PV2 Voltage	PV2 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt1 For HTN series, str2/mppt1 Please refer to table 8-2
32019	7D13	PV2 Current	PV2 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt1 For HTN series, str2/mppt1 Please refer to table 8-2
32020	7D14	PV3 Voltage	PV3 电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt2 For HTN series, str3/mppt1 Please refer to table 8-2
32021	7D15	PV3 Current	PV3 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt2 For HTN series, str3/mppt1 Please refer to table 8-2
32022	7D16	PV4 Voltage	PV4 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt2 For HTN series, str1/mppt2 Please refer to table 8-2
32023	7D17	PV4 Current	PV4 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt2 For HTN series, str1/mppt2 Please refer to table 8-2
32024	7D18	PV5 Voltage	PV5 电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt3 For HTN series, str2/mppt2 Please refer to table 8-2
32025	7D19	PV5 Current	PV5 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt3 For HTN series, str2/mppt2 Please refer to table 8-2

32026	7D1A	PV6 Voltage	PV6 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt3 For HTN series, str3/mppt2 Please refer to table 8-2
32027	7D1B	PV6 Current	PV6 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt3 For HTN series, str3/mppt2 Please refer to table 8-2
32028	7D1C	PV7 Voltage	PV7 电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt4 For HTN series, str3/mppt3 Please refer to table 8-2
32029	7D1D	PV7 Current	PV7 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt4 For HTN series, str1/mppt3 Please refer to table 8-2
32030	7D1E	PV8 Voltage	PV8 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt4 For HTN series, str1/mppt3 Please refer to table 8-2
32031	7D1F	PV8 Current	PV8 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt4 For HTN series, str2/mppt3 Please refer to table 8-2
32032	7D20	PV9 Voltage	PV9 电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt5 For HTN series, str3/mppt3 Please refer to table 8-2
32033	7D21	PV9 Current	PV9 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt5 For HTN series, str3/mppt3 Please refer to table 8-2
32034	7D22	PV10 Voltage	PV10 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt5 For HTN series, str1/mppt4 Please refer to table 8-2
32035	7D23	PV10 Current	PV10 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt5 For HTN series, str1/mppt4 Please refer to table 8-2
32036	7D24	PV11 Voltage	PV11 电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt6 For HTN series, str2/mppt4 Please refer to table 8-2
32037	7D25	PV11 Current	PV11 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt6 For HTN series, str2/mppt4 Please refer to table 8-2
32038	7D26	PV12 Voltage	PV12 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt6 For HTN series, str3/mppt4 Please refer to table 8-2
32039	7D27	PV12 Current	PV12 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt6 For HTN series, str3/mppt4 Please refer to table 8-2
32040	7D28	PV13 Voltage	PV13电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt7 For HTN series, str1/mppt5 Please refer to table 8-2
32041	7D29	PV13 Current	PV13 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt7 For HTN series, str1/mppt5 Please refer to table 8-2
32042	7D2A	PV14 Voltage	PV14 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt7 For HTN series, str2/mppt5 Please refer to table 8-2
32043	7D2B	PV14 Current	PV14 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt7 For HTN series, str2/mppt5 Please refer to table 8-2
32044	7D2C	PV15 Voltage	PV15 电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt8 For HTN series, str3/mppt5 Please refer to table 8-2
32045	7D2D	PV15 Current	PV15 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt8 For HTN series, str3/mppt5 Please refer to table 8-2
32046	7D2E	PV16 Voltage	PV16 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt8 For HTN series, str1/mppt6 Please refer to table 8-2
32047	7D2F	PV16 Current	PV16 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt8 For HTN series, str1/mppt6 Please refer to table 8-2
32048	7D30	PV17 Voltage	PV17 电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt9 For HTN series, str2/mppt6 Please refer to table 8-2
32049	7D31	PV17 Current	PV17 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt9 For HTN series, str2/mppt6 Please refer to table 8-2
32050	7D32	PV18 Voltage	PV18 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt9 For HTN series, str3/mppt6 Please refer to table 8-2

32051	7D33	PV18 Current	PV18 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt9 For HTN series, str3/mppt6 Please refer to table 8-2
32052	7D34	PV19 Voltage	PV19 电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt10 For HTN series, N.A. Please refer to table 8-2
32053	7D35	PV19 Current	PV19 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt10 For HTN series, N.A. Please refer to table 8-2
32054	7D36	PV20 Voltage	PV20 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt10 For HTN series, N.A. Please refer to table 8-2
32055	7D37	PV20 Current	PV20 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt10 For HTN series, N.A. Please refer to table 8-2
32056	7D38	PV21 Voltage	PV21 电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt11 For HTN series, N.A. Please refer to table 8-2
32057	7D39	PV21 Current	PV21 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt11 For HTN series, N.A. Please refer to table 8-2
32058	7D3A	PV22 Voltage	PV22 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt11 For HTN series, N.A. Please refer to table 8-2
32059	7D3B	PV22 Current	PV22 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt11 For HTN series, N.A. Please refer to table 8-2
32060	7D3C	PV23 Voltage	PV23 电压	RO	S16	1	10	V	[0,0]	For HTU series, str1/mppt12 For HTN series, N.A. Please refer to table 8-2
32061	7D3D	PV23 Current	PV23 电流	RO	S16	1	100	A	[0,0]	For HTU series, str1/mppt12 For HTN series, N.A. Please refer to table 8-2
32062	7D3E	PV24 Voltage	PV24 电压	RO	S16	1	10	V	[0,0]	For HTU series, str2/mppt12 For HTN series, N.A. Please refer to table 8-2
32063	7D3F	PV24 Current	PV24 电流	RO	S16	1	100	A	[0,0]	For HTU series, str2/mppt12 For HTN series, N.A. Please refer to table 8-2
32064	7D40	Input Power(DC Power)	输入功率(DC 功率)	RO	S32	2	1000	Kw	[0,0]	Total input power in DC side
32066	7D42	Grid AB-Line Voltage	电网 AB 线电压	RO	U16	1	10	V	[0,0]	
32067	7D43	Grid BC-Line Voltage	电网BC线电压	RO	U16	1	10	V	[0,0]	
32068	7D44	Grid CA-Line Voltage	电网 CA 线电压	RO	U16	1	10	V	[0,0]	
32069	7D45	Grid A-phase voltage	电网 A 相电压	RO	U16	1	10	V	[0,0]	
32070	7D46	Grid B-phase voltage	电网 B 相电压	RO	U16	1	10	V	[0,0]	
32071	7D47	Grid C-phase voltage	电网 C 相电压	RO	U16	1	10	V	[0,0]	
32072	7D48	Grid A-phase current	电网 A 相电流	RO	S32	2	1000	A	[0,0]	
32074	7D4A	Grid B-phase current	电网 B 相电流	RO	S32	2	1000	A	[0,0]	
32076	7D4C	Grid C-phase current	电网 C 相电流	RO	S32	2	1000	A	[0,0]	
32078	7D4E	Peak active power of the day	当天峰值有功功率	RO	S32	2	1000	kW	[0,0]	
32080	7D50	active Power	有功功率	RO	S32	2	1000	kW	[0,0]	Output AC active power

32082	7D52	reactive Power	无功功率	RO	S32	2	1000	kVar	[0,0]	Output AC reactive power
32084	7D54	power factor	功率因数	RO	S16	1	1000	N/A	[0,0]	
32085	7D55	grid frequency	电网频率	RO	U16	1	100	Hz	[0,0]	
32086	7D56	Efficiency	效率	RO	U16	1	100	%	[0,0]	Inverter efficiency
32087	7D57	internal temperature(Cavity temperature)	内部温度(腔体温度)	RO	S16	1	10	℃	[0,0]	Internal temperature of inverter
32106	7D6A	Cumulative power generation	累计发电量	RO	U32	2	100	kWh	[0,0]	
32114	7D72	power generation of the day	当日发电量	RO	U32	2	100	kWh	[0,0]	
32116	7D74	power generation of the month	当月发电量	RO	U32	2	100	kWh	[0,0]	
32118	7D76	power generation of the year	当年发电量	RO	U32	2	100	kWh	[0,0]	
32180	7DB4	Active Power(Fast Active power Calculation)	有功功率(快速有功功率计算结果)	RO	S32	2	1000	kW	[0,0]	N.A. for HT 1100
32244	7DF4	A-phase THDi Value	A相THDi值	RO	U16	1	1000	N/A	[0,0]	
32245	7DF5	A-phase voltage THDu Value	A 相相电压 THDu 值	RO	U16	1	1000	N/A	[0,0]	
32246	7DF6	A-phase line voltage THDu Value	A 相线电压 THDu 值	RO	U16	1	1000	N/A	[0,0]	
32247	7DF7	B-phase THDi Value	B 相 THDi 值	RO	U16	1	1000	N/A	[0,0]	
32248	7DF8	B-phase voltage THDu Value	B 相相电压 THDu 值	RO	U16	1	1000	N/A	[0,0]	
32249	7DF9	B-phase line voltage THDu Value	B 相线电压 THDu 值	RO	U16	1	1000	N/A	[0,0]	
32250	7DFA	C-phase THDi Value	C 相 THDi 值	RO	U16	1	1000	N/A	[0,0]	
32251	7DFB	C-phase voltage THDu Value	C 相相电压 THDu 值	RO	U16	1	1000	N/A	[0,0]	
32252	7DFC	C-phase line voltage THDu Value	C 相线电压 THDu 值	RO	U16	1	1000	N/A	[0,0]	
35500	8AAC	Inverter Capacity	逆变器额定容量	RO	U16	1	10	kW	[0, 0]	
35501	8AAD	Connection Type	接线方式	RO	U16	1	1	N/A	[0, 0]	0: 3W/PE 1: 3W/N/PE
35502	8AAE	Device serial number(DSP)	设备序列号(DSP)	RO	STR	8	1	N/A	[0, 0]	SN of inverter
35510	8AB6	Device model(DSP)	设备型号(DSP)	RO	STR	5	1	N/A	[0, 0]	Model type of inverter
35515	8ABB	DSP1 software version	DSP1 软件版本	RO	U16	1	1	N/A	[0, 0]	Main DSP software version
35516	8ABC	DSP2 software version	DSP2 软件版本	RO	U16	1	1	N/A	[0, 0]	Slave DSP software version

Address Decimal (十进制)	Hexadecimal (十六进制)	English Name 英文名称	Chinese Name 中文名称	#R/W 读写	#Type 类型	#Length 长度	#SF Gain 增益	#Units 单位	Range 范围	Note 备注
35710	8B7E	DSP fault code	主DSP故障代码	RO	U32	2	1	N/A	[0, 0]	Please refer to the details in table 8-3
35718	8B86	Slave DSP fault code	副 DSP 故障码	RO	U32	2	1	N/A	[0, 0]	Please refer to the details in table 8-3
35751	8BA7	Safety Country Code	安规国家代码	RO	U16	1	1	N/A	[0, 0]	
35755	8BAB	Derating Mode	降载模式 (Derating Mode)	RO	U32	2	1	N/A	[0, 0]	Bit 0:Over temperature derating Bit 1: 0 power export (multi-inverters) derating Bit 2: Reactive power derating(Reactive power output is on priority, it may derating active power to maintain high reactive power output) Bit 3: Power against high Frequency Bit 4: PU Curve derating Bit 5: 0 power export derating Bit 6: (DRED derating Bit 7: Derating under power ramping limit Bit 8: Derating against high current Bit 9: Derating against high bus voltage Bit 10: Power limit against Power calibration (For ATS) Bit 11: Derating against power scheduling Bit 12:Derating under over current limit Bit 13:Derating under Max. power limit
35757	8BAD	ISO values	ISO 检测值	RO	U16	1	1	KΩ	[0, 0]	
35767	8BB7	PID mode status	PID 模块状态	RO	U16	1	1	N/A	[0, 0]	Bit 0: 0: Normal 1: Fault Bit 1: 0:No PID detected 1:PID detected
35768	8BB8	leak current Average Value	漏电流有效值	RO	U16	1	1	mA	[0, 0]	
37207	9157	running state of the inverter	逆变器运行状态	RO	U16	1	1	N/A	[0, 0]	Please refer to table 8-4

Address Decimal (十进制)	Hexadecimal (十六进制)	English Name 英文名称	Chinese Name 中文名称	#R/W 读写	#Type 类型	#Length 长度	#SF Gain 增益	#Units 单位	Range 范围	Note 备注
41313	A161	Device RTC Time Year/Month	设备 RTC 时间年/月	RW	U16	1	1	N/A	[0, 0]	MSB Year/LSB Month 13-99/1-12
41314	A162	DeviceRTCTimeDay/Hour	设备 RTC 时间日/时	RW	U16	1	1	N/A	[0, 0]	MSB Day/LSB Hour 1-31/0- 23
41315	A163	Device RTC Time Minute/Second	设备 RTC 时间分/秒	RW	U16	1	1	N/A	[0, 0]	MSB Minute/LSB Second 0-59/0-59
41322	A16A	ISO threshold	ISO阈值	RW	U16	1	1	KΩ	[0,1000]	
41323	A16B	LVRT Enable	低穿使能位	RW	U16	1	1	N/A	[0,1]	0-Off,1-On

41324	A16C	HVRT Enable	高穿使能位	RW	U16	1	1	N/A	[0,1]	0-Off,1-On
41325	A16D	Islanding_Disable	反孤岛功能	RW	U16	1	1	N/A	[0,1]	0: Off, means disable off, islanding function enabled. 1: On, means disable on, islanding function disabled.
41326	A16E	Shadow mode switch	阴影模式	RW	U16	1	1	N/A	[0,1]	0-Off,1-On
41327	A16F	Software ARP Switch	防逆流开关	RW	U16	1	1	N/A	[0,1]	0-Off,1-On
41328	A170	Upload power under 0 power export mode	逆流上行功率	RW	U32	2	1	N/A	[0,1000000]	Under 0 power export function
41330	A172	Power On	开机(允许并网自检)	RW	U16	1	1	N/A	[0,1]	Write 0 to take effect
41331	A173	Power Off	关机(不允许并网自检)	RW	U16	1	1	N/A	[0,1]	Write 0 to take effect
41332	A174	Restart	重启(重连)	WO	U16	1	1	N/A	[1,1]	Write 0 to take effect
41335	A177	Grid Type	输出方式	RW	U16	1	1	N/A	[0,1]	0: (3W/PE) 1: (3W/N/PE)
41336	A178	Set the ARP power percentage	逆流上行功率百分比设置	RW	U16	1	1	%Pn	[0,110]	0 power export value
41339	A17B	Over load Switch	过载功能开关	RW	U16	1	1	N/A	[0,1]	Applicable for 225kW inverter 0: max power 225kW 1: max power 250kW
41345	A181	Hardware ARP Switch	硬件防逆流开关	RW	U16	1	1	N/A	[0,1]	0:off 1:on
41378	A1A2	South Korea one-click interrupt	韩国一键中断开关	RW	U16	1	1	N/A	[0,1]	0:off 1:on For HT1100 only
41380	A1A4	Maximum active power Limit	有功功率最大值限制	RW	U16	1	10	Kw	[0,4000]	For HT1500
41383	A1A7	Maximum AC Curr Limit	交流最大电流限制	RW	U16	1	10	A	[0,4000]	For HT1500
41480	A208	Active Control adjust	有功调节量	RW	U16	1	1	%	[0,110]	0%-100% active power (saved)
41481	A209	PF reactive power adjust	PF 无功调节量	RW	S16	1	1	%	[1,20], [80,100]	[1,20] is corresponding to lagging 0.99-0.8 (e.g. set to 10, PF is (10-100)/100=-0.9) [80-100] is corresponding to leading 0.80-1 (e.g. set to 90, the PF is 90/100=0.9) Note: if value returns to 0xffff, it means that the inverter is not in PF setting mode (saved)
41482	A20A	Reactive power adjust	无功调节量	RW	S32	2	1	Var	[0, 0]	Reactive power setting (32 bits) Note: if value returns to 0xffffffff, it means that the inverter not in reactive power setting mode. (saved)
41484	A20C	Reactive power adjust (percentage adjust)	无功调节量(百分比调节)	RW	S16	1	1	%	[-60, 60]	Reactive power setting (16 bits) (saved)

41485	A20D	Power On Voltage	起机电压(开始并网电压)	RW	U16	1	10	V	[600,6000]	Start up voltage (PV) (60.0~600.0V)
41486	A20E	Reconnection time	重连时间	RW	U16	1	1	s	[1,1200]	Reconnection waiting time
41487	A20F	Lower limit of grid voltage	市电电压下限	RW	U16	1	10	V	[0,0]	Minimum AC voltage for inverter connection
41488	A210	GridVoltUpSet	市电电压上限	RW	U16	1	10	V	[0,0]	Max. AC voltage for inverter connection
41489	A211	Lower limit of grid frequency	市电频率下限	RW	U16	1	100	Hz	[0,0]	Minimum frequency for inverter connection
41490	A212	GridFreqUpSet	市电频率上限	RW	U16	1	100	Hz	[4500,60000]	Max. frequency for inverter connection
41500	A21C	Safety Country Code	安规代码	RW	U16	1	1	N/A	[0, 0]	Safety code
41501	A21D	Overvoltage trigger (first level) value(0.1%)	过压触发一阶值(0.1%)	RW	U16	1	10	%	[800,1400]	
41502	A21E	Overvoltage trigger (first level) trip time	过压触发一阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41503	A21F	Overvoltage trigger (second level) value(0.1%)	过压触发二阶值(0.1%)	RW	U16	1	10	%	[800,1400]	
41504	A220	Overvoltage trigger(second level) trip time	过压触发二阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41505	A221	Undervoltage trigger (first level) value(0.1%)	欠压触发一阶值(0.1%)	RW	U16	1	10	%	[150,1000]	
41506	A222	Undervoltage trigger (first level) trip time	欠压触发一阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41507	A223	Undervoltage trigger (second level) value(0.1%)	欠压触发二阶值(0.1%)	RW	U16	1	10	%	[150,1000]	
41508	A224	Undervoltage trigger (second level) trip time	欠压触发二阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41509	A225	10min overvoltage trigger value (0.1%)	10min 过压触发值(0.1%)	RW	U16	1	10	%	[800,1400]	
41510	A226	Overfrequence trigger (first level) value(0.1%)	过频触发一阶值	RW	U16	1	100	Hz	[5000,6500]	
41511	A227	Overfrequence trigger (first level) trip time	过频触发一阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41512	A228	Overfrequence trigger (second level) value(0.1%)	过频触发二阶值	RW	U16	1	100	Hz	[5000,6500]	
41513	A229	Overfrequence trigger (second level) trip time	过频触发二阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41514	A22A	Underfrequence trigger (first level) value(0.1%)	欠频触发一阶值	RW	U16	1	100	Hz	[4500,6000]	

41515	A22B	Underfrequence trigger (first level) trip time	欠频触发一阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41516	A22C	Underfrequence trigger (second level) value(0.1%)	欠频触发二阶值	RW	U16	1	100	Hz	[4500,6000]	
41517	A22D	Underfrequence trigger (second level) trip time	欠频触发二阶跳脱时间	RW	U16	1	1	periods	[1,65635]	
41518	A22E	Overvoltage trigger (first level) value(0.1%)	过压触发一阶值(0.1%)	RW	U16	1	10	%	[800,1400]	
41519	A22F	Overvoltage trigger (first level) trip time	过压触发一阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41520	A230	Overvoltage trigger (second level) value(0.1%)	过压触发二阶值(0.1%)	RW	U16	1	10	%	[800,1400]	
41521	A231	Overvoltage trigger (second level) trip time	过压触发二阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41522	A232	Undervoltage trigger (first level) value(0.1%)	欠压触发一阶值(0.1%)	RW	U16	1	10	%	[150,1000]	
41523	A233	Undervoltage trigger (first level) trip time	欠压触发一阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41524	A234	Undervoltage trigger (second level) value(0.1%)	欠压触发二阶值(0.1%)	RW	U16	1	10	%	[150,1000]	
41525	A235	Undervoltage trigger (second level) trip time	欠压触发二阶跳脱时间	RW	U16	1	1	periods	[0,0]	
41526	A236	Normal condition upper limit of connection voltage	连接电压上限(0.1%)	RW	U16	1	10	%	[800,1400]	
41527	A237	Normal condition lowerer limit of connection voltage	连接电压下限(0.1%)	RW	U16	1	10	%	[150,1000]	
41528	A238	Normal condition upper limit of connection frequency	连接频率上限	RW	U16	1	100	Hz	[5000,6500]	
41529	A239	Normal condition lowerer limit of connection frequency	连接频率下限	RW	U16	1	100	Hz	[4500,6000]	
41530	A23A	Normal condition Grid connection waiting time	并网等待时间	RW	U16	1	1	s	[1,1200]	
41531	A23B	Fault condition upper limit of connection voltage	故障条件连接电压上限	RW	U16	1	10	%	[800,1400]	

41532	A23C	Fault condition lowerer limit of connection voltage	故障条件连接电压下限	RW	U16	1	10	%	[150,1000]	
41533	A23D	Fault condition upper limit of connection frequency	故障条件连接频率上限	RW	U16	1	100	Hz	[5000,6500]	
41534	A23E	Fault condition lowerer limit of connection frequency	故障条件连接频率下限	RW	U16	1	100	Hz	[4500,6000]	
41535	A23F	Fault condition Grid connection waiting time	故障条件并网等待时间	RW	U16	1	1	s	[1,1200]	
41536	A240	Slope of normal condition grid-connected power	并网功率斜率(0.1%)	RW	U16	1	10	%/min	[50,65000]	Start-up power slope (5.0%~6500.0%)
41537	A241	Slope of Fault condition Grid-connected power slope(0.1%)	故障条件并网功率斜率(0.1%)	RW	U16	1	10	%/min	[50,65000]	Reconnection after fault power slope(5.0%~6500.0%)
41538	A242	Slope Power reduction	功率调度斜率(0.1%)	RW	U16	1	10	%/min	[50,65000]	Slope for DRED control (5.0%~6500.0%)
41600	A280	cos φ (P) curve enable	cos φ (P)曲线	RW	U16	1	1	N/A	[0, 1]	0: Disable 1: Enable The switch is for 41600-41609
41601	A281	Power A(0.1%)	A 点功率(0.1%)	RW	U16	1	10	%	[0, 1500]	Power at point A
41602	A282	cos φ A(pf,0.001)	A 点 cos φ 值(pf,0.001)	RW	S16	1	1000	N/A	[0, 0]	PF at point A
41603	A283	Power B(0.1%)	B 点功率(0.1%)	RW	U16	1	10	%	[0, 1500]	Power at point B
41604	A284	cos φ B(pf,0.001)	B 点 cos φ 值	RW	S16	1	1000	N/A	[0, 0]	PF at point B
41605	A285	Power C(0.1%)	C 点功率(0.1%)	RW	U16	1	10	%	[0, 1500]	Power at point C
41606	A286	cos φ C(pf,0.001)	C 点 cos φ 值	RW	U16	1	1000	N/A	[0, 0]	PF at point C
41607	A287	voltage ofEnter the curve (0.1%)	进入曲线电压(0.1%)	RW	U16	1	10	%	[0,2000]	
41608	A288	voltage of quit the curve(0.1%)	退出曲线电压(0.1%)	RW	U16	1	10	%	[0,2000]	
41609	A289	power of quit the curve (0.1%)	退出曲线功率(0.1%)	RW	U16	1	10	%	[0, 1500]	
41620	A294	Power derating/raising against frequency	过频降载曲线	RW	U16	1	1	N/A	[0,1]	Derating against high frequency or power raising against low frequency bottom
41621	A295	Response type	响应方式	RW	U16	1	1	N/A	[0,1]	0: VDE 1: CEI
41622	A296	According to the Cut-off frequency response	根据截止频率响应	RW	U16	1	1	NA	[0, 5]	

41623	A297	Discharge mode over frequency point	放电模式过频点	RW	U16	1	100	Hz	[4500,6500]	
41624	A298	Charging mode underfrequency point	充电模式欠频点	RW	U16	1	100	Hz	[4500,6500]	
41625	A299	Discharge mode overfrequency end point	放电模式过频终点	RW	U16	1	100	Hz	[4500,6500]	
41626	A29A	Charging mode underfrequency end point	充电模式欠频终点	RW	U16	1	100	Hz	[4500,6500]	
41627	A29B	recovery wait time	恢复等待时间	RW	U16	1	1	s	[1,3000]	
41628	A29C	Recovery frequency Upper limit	恢复频率上限	RW	U16	1	100	Hz	[4500,6500]	
41629	A29D	Recovery frequency lower limit	恢复频率下限	RW	U16	1	100	Hz	[4500,6500]	
41630	A29E	Recovery slope (0.1%)	恢复斜率 (0.1%)	RW	U16	1	10	%/min	[0,0]	
41631	A29F	Response according to slope	根据斜率响应	RW	U16	1	1	N/A	[0,0]	
41632	A2A0	Discharge mode over frequency point	放电模式过频点	RW	U16	1	100	Hz	[5000,6500]	
41633	A2A1	Charging mode underfrequency point	充电模式欠频点	RW	U16	1	100	Hz	[4500,6000]	
41634	A2A2	Derating Reference Power Mode	降载基准功率模式	RW	U16	1	1	N/A	[0,0]	
41635	A2A3	Derating slope	降载斜率	RW	U16	1	10	0.1%/Hz	[0, 1000]	
41636	A2A4	CEI overfrequency terminal, VDE overfrequency load reduction reference power mode	Stop 模式下恢复功率参考	RW	U16	1	1	N/A	[0,2]	0:cPowerFreq_Pm 1:cPowerFreq_Pn 2:cPowerFreq_Px
41638	A2A6	VDE overfrequency recovery frequency point	VDE 过频恢复频率点	RW	U16	1	100	Hz	[5000,6500]	
41650	A2B2	QU curve enable	QU曲线	RW	U16	1	1	N/A	[0, 1]	0: off 1: on
41651	A2B3	power of enter the curve (0.1%)	进入曲线功率(0.1%)	RW	U16	1	10	%	[1, 1500]	
41652	A2B4	power of quit the curve (0.1%)	退出曲线功率(0.1%)	RW	U16	1	10	%	[1, 1500]	
41653	A2B5	Voltage1(0.1%)	V1 电压值 (0.1%)	RW	U16	1	10	%	[0, 2000]	Voltage(%) at V1 in QU curve
41654	A2B6	reactive power 1(0.1%)	V1 无功值 (0.1%)	RW	U16	1	10	%	[1, 1500]	Reactive power(%) at V1 in QU curve

41655	A2B7	Voltage2(0.1%)	V2 电压值(0.1%)	RW	U16	1	10	%	[0, 2000]	Voltage(%) at V2 in QU curve
41656	A2B8	reactive power 2(0.1%)	V2 无功值(0.1%)	RW	U16	1	10	%	[1, 1500]	Reactive power(%) at V2 in QU curve
41657	A2B9	Voltage3(0.1%)	V3 电压值(0.1%)	RW	U16	1	10	%	[0, 2000]	Voltage(%) at V3 in QU curve
41658	A2BA	reactive power 3(0.1%)	V3 无功值(0.1%)	RW	U16	1	10	%	[1, 1500]	Reactive power(%) at V3 in QU curve
41659	A2BB	Voltage4(0.1%)	V4 电压值(0.1%)	RW	U16	1	10	%	[0, 2000]	Voltage(%) at V4 in QU curve
41660	A2BC	reactive power 4(0.1%)	V4 无功值(0.1%)	RW	U16	1	10	%	[1, 1500]	Reactive power(%) at V4 in QU curve
41661	A2BD	K value (percentage of reactive power corresponding to Pn)	K 值(无功对应 Pn 的百分比，V2 值和 V3 值、K 值选择一种设置)	RW	U16	1	10	N/A	[0, 0]	
41662	A2BE	Filtering time constant	滤波时间常数	RW	U16	1	1	s	[0,600]	
42571	A64B	QU curve operation mode	QU 曲线模式	RW	U16	1	1	N/A	[0,0]	NA for HT1500
42572	A64C	QU Enter the curve condition enabling switch	QU 曲线进入条件使能开关	RW	U16	1	1	N/A	[0,1]	0:off 1:on NA for HT1500
42573	A64D	QU curve Slope1	V1 点对应斜率	RW	U16	1	10	%Qmax/1%Vn	[0,2000]	NA for HT1500
42574	A64E	QU curve Slope2	V4 点对应斜率	RW	U16	1	10	%Qmax/1%Vn	[0,2000]	NA for HT1500
42575	A64F	QU curve Volt Dead	电压死区宽度	RW	U16	1	10	%Vn	[0,100]	NA for HT1500
41680	A2D0	PU curve enable	PU曲线	RW	U16	1	1	N/A	[0, 1]	
41681	A2D1	PU curve mode	PU 模式	RW	U16	1	1	N/A	[0, 1]	
41683	A2D3	Voltage1(0.1%)	V1 电压值(0.1%)	RW	U16	1	10	%	[0, 2000]	
41684	A2D4	active power 1(0.1%)	V1 有功值(0.1%)	RW	U16	1	10	%	[1, 1500]	
41685	A2D5	Voltage2(0.1%)	V2 电压值(0.1%)	RW	U16	1	10	%	[0, 2000]	
41686	A2D6	active power 2(0.1%)	V2 有功值(0.1%)	RW	U16	1	10	%	[1, 1500]	
41688	A2D8	Voltage3(0.1%)	V3 电压值(0.1%)	RW	U16	1	10	%	[0, 2000]	
41689	A2D9	active power 3(0.1%)	V3 有功值(0.1%)	RW	U16	1	10	%	[1, 1500]	
41690	A2DA	Voltage4(0.1%)	V4 电压值(0.1%)	RW	U16	1	10	%	[0, 2000]	
41691	A2DB	active power 4(0.1%)	V4 有功值(0.1%)	RW	U16	1	10	%	[1, 1500]	
41700	A2E4	QP curve flag	Q(P)曲线	RW	U16	1	10	N/A	[0, 1]	

41701	A2E5	QP curve mode	Q(P)模式	RW	U16	1	1	N/A	[0, 0]	
41702	A2E6	active power 1	P1 功率值	RW	U16	1	1	%	[0,1000]	NA for HT1100
41703	A2E7	reactive power 1	P1 设定 Q 值	RW	U16	1	10	%	[-600, 600]	NA for HT1100
41704	A2E8	active power 2	P2 功率值	RW	U16	1	10	%	[0, 1000]	NA for HT1100
41705	A2E9	reactive power 2	P2 设定 Q 值	RW	U16	1	10	%	[-600, 600]	NA for HT1100
41706	A2EA	active power 3	P3 功率值	RW	U16	1	10	%	[0, 1000]	
41707	A2EB	reactive power 3	P3 设定 Q 值	RW	U16	1	10	%	[-600, 600]	
41708	A2EC	active power 4	P4 功率值	RW	U16	1	10	%	[0, 1000]	
41709	A2ED	reactive power 4	P4 设定 Q 值	RW	U16	1	10	%	[-600, 600]	
41710	A2EE	active power 5	P5 功率值	RW	U16	1	10	%	[0, 1000]	
41711	A2EF	reactive power 5	P5 设定 Q 值	RW	U16	1	10	%	[-600, 600]	
41804	A34C	Active power gradient	有功功率变化梯度	RW	U16	1	10	%/min	[1,1000]	
41814	A356	Active slope loading switch	有功斜率加载开关	RW	U16	1	1	N/A	[0, 1]	
41820	A35C	Active power regulation (0.1%)	有功调节量 (0.1%)	RW	U16	1	10	%	[0,1100]	Fast power response, uner goose protocol (Not applicable for HT1100) Not saved
41824	A360	Reactive power regulation (0.1%)	无功调节量 (0.1%)	RW	U16	1	10	%	[-600,600]	
42061	A44D	PID prevent function switch	PID 预防功能开关	RW	U16	1	1	N/A	[0,1]	0:off 1:on NA for HT1100
42408	A5A8	Active power percentage derating command(0.1%)	有功功率百分比快速降额指令 (0.1%)	RW	S16	1	10	%Pn	[0,1100]	NA for HT1100, NOT saved
42419	A5B3	Reactive power compensation command(Q/S)	无功功率快速补偿指令 (Q/S)	RW	S16	1	10	%Pn	[-600,600]	NA for HT1100, NOT saved
42420	A5B4	Reactive power compensation command(PF)	无功功率快速补偿指令 (PF)	RW	S16	1	1000	N/A	[-1000,1000]	NA for HT1100, NOT saved
42441	A5C9	Night reactive mode	夜间无功功能开关	RW	U16	1	1	N/A	[0,1]	0:off 1:on NA for HT1100
42442	A5CA	Night reactive power parameters enable	夜间无功参数生效	RW	U16	1	1	N/A	[0,1]	0:off 1:on NA for HT1100 Only when this address enabled, the inverter can response to following register 42444, 42446.

42443	A5CB	Night reactive power compensation mode	夜间无功调度模式	RW	U16	1	1	N/A	[0,1]	0: Value (saved) 1:percentage (saved) NA for HT1100
42444	A5CC	Night reactive power compensation fixed value	夜间无功调度补偿固定值	RW	S32	2	1	Var	[-150000, 150000]	NA for HT1100
42446	A5CE	Night reactive power compensation percentage derating	夜间无功调度百分比(0.1%)	RW	U16	1	10	%Pn	[-600,600]	NA for HT1100
42732	A6EC	Undervoltage trigger third order value(0.1%)	欠压触发三阶值(0.1%)	RW	U16	1	10	%Vn	[0,1000]	0: off
42733	A6ED	Undervoltage trigger third-order trip time	欠压触发三阶跳脱时间	RW	U16	1	1	periods	[0,0]	
42735	A6EF	Overvoltage trigger third order value(0.1%)	过压触发三阶值(0.1%)	RW	U16	1	10	%Vn	[800,1400]	
42736	A6F0	Overvoltage trigger third-order trip time	过压触发三阶跳脱时间	RW	U16	1	1	periods	[0,0]	
42738	A6F2	Undervoltage trigger fourth order value(0.1%)	欠压触发四阶值(0.1%)	RW	U16	1	10	%Vn	[0,1000]	
42739	A6F3	Undervoltage trigger fourth-order trip time	欠压触发四阶跳脱时间	RW	U16	1	1	periods	[0,0]	
42741	A6F5	Overvoltage trigger fourth-order trip time	过压触发四阶值(0.1%)	RW	U16	1	10	%Vn	[800,1400]	
42742	A6F6	Underfrequence trigger (first level) value(0.1%)	过压触发四阶跳脱时间	RW	U16	1	1	periods	[0,0]	
42756	A704	Underfrequence trigger third order value(0.1%)	欠频触发三阶值	RW	U16	1	100	Hz	[4500,6000]	
42757	A705	Underfrequence trigger third-order trip time	欠频触发三阶跳脱时间	RW	U16	1	1	periods	[0,0]	
42759	A707	Overfrequnce trigger third order value(0.1%)	过频触发三阶值	RW	U16	1	100	Hz	[5000,6500]	
42760	A708	Overfrequnce trigger third-order trip time	过频触发三阶跳脱时间	RW	U16	1	1	periods	[0,0]	
42762	A70A	Underfrequence trigger fourth order value(0.1%)	欠频触发四阶值	RW	U16	1	100	Hz	[4500,6000]	
42763	A70B	Underfrequence trigger fourth-order trip time	欠频触发四阶跳脱时间	RW	U16	1	1	periods	[0,0]	
42765	A70D	Overfrequnce trigger fourth order value(0.1%)	过频触发四阶值	RW	U16	1	100	Hz	[5000,6500]	
42766	A70E	Overfrequnce trigger fourth-order trip time	过频触发四阶跳脱时间	RW	U16	1	1	periods	[0,0]	

42800	A730	Fault ride-through processing volume mode selection	故障穿越加工量模式选择	RW	U16	1	1	N/A	0:基波正序分量 Ud 1: 相电压重构 2:线电压重构	0: Positive sequence component of fundamental wave 1: Phase voltage reconstruction 2: Line voltage reconstruction
42801	A731	Fault ride through variation machining mode enable	电压变化量高低穿模式使能	RW	U16	1	1	N/A	0:关闭 1:打开	0: off 1: on
42802	A732	Variation Threshold	电压变化量高低穿判断阈值	RW	U16	1	10	%Vn	[0,1000]	threshold value of determining FVRT
42804	A734	Reactive Current Injection Mode	无功电流注入模式	RW	U16	1	1	N/A	[0,1]	0: Absolute injection 1: Relative injection
42823	A747	LVRT enable	低穿使能位	RW	U16	1	1	N/A	[0,1]	0: off 1: on
42824	A748	The judgment threshold of entering LVRT	进入低穿的判断阈值	RW	U16	1	10	%Vn	[0,1000]	The voltage trigger LVRT function
42827	A74B	LVRT positive active power current adjust enable	低穿正序有功电流调节使能位	RW	U16	1	1	N/A	[0,1]	0: off 1: on
42828	A74C	LVRT positive reactive power current adjust enable	低穿正序无功电流调节使能位	RW	U16	1	1	N/A	[0,1]	0: off 1: on
42829	A74D	LVRT negative active power current adjust enable	低穿负序无功电流调节使能位	RW	U16	1	1	N/A	[0,1]	0: off 1: on
42831	A74F	LVRT positive sequence reactive K value	低穿正序无功 K 值	RW	U16	1	100	N/A	[0,1000]	During LVRT, inverter will support the grid by generating positive reactive power, the address specify the value of reactive power
42837	A755	LVRT 0-current mode enable	低穿零电流模式使能位	RW	U16	1	1	N/A	[0,1]	0: off 1: on
42838	A756	LVRT 0-current mode enter voltage limit	低穿零电流模式进入电压阈值	RW	U16	1	10	%/Vn	[0,1000]	
42850	A762	LVRT depth 1	低穿深度 1	RW	U16	1	10	%/Vn	[0,1000]	
42851	A763	maintenance time 1	维持时间 1	RW	U16	1	1	10ms	[0,65000]	
42852	A764	LVRT depth 2	低穿深度 2	RW	U16	1	10	%/Vn	[0,1000]	
42853	A765	maintenance time 2	维持时间 2	RW	U16	1	1	10ms	[0,65000]	
42854	A766	LVRT depth 3	低穿深度 3	RW	U16	1	10	%/Vn	[0,1000]	
42855	A767	maintenance time 3	维持时间 3	RW	U16	1	1	10ms	[0,65000]	

42856	A768	LVRT depth 4	低穿深度 4	RW	U16	1	10	%/Vn	[0,1000]	
42857	A769	maintenance time 4	维持时间 4	RW	U16	1	1	10ms	[0,65000]	
42858	A76A	LVRT depth 5	低穿深度 5	RW	U16	1	10	%/Vn	[0,1000]	
42859	A76B	maintenance time 5	维持时间 5	RW	U16	1	1	10ms	[0,65000]	
42875	A77B	HVRT enable	高穿使能位	RW	U16	1	1	N/A	[0,1]	0: off 1: on
42876	A77C	The judgment threshold of entering HVRT	进入高穿的判断阈值	RW	U16	1	10	%/Vn	[1000,1400]	The voltage trigger HVRT function
42883	A783	HVRT positive sequence reactive K value	高穿正序无功 K 值	RW	U16	1	100	N/A	[0,1000]	
42889	A789	HVRT 0-current mode enable	高穿零电流模式使能	RW	U16	1	1	N/A	[0,1]	
42890	A78A	HVRT 0-current mode enter voltage limit	高穿零电流模式进入电压阈值	RW	U16	1	10	%Vn	[1000,1400]	
42902	A796	HVRT depth 1	高穿深度 1	RW	U16	1	10	%Vn	[1000,1400]	
42903	A797	maintenance time 1	维持时间 1	RW	U16	1	1	10ms	[0,65000]	
42904	A798	HVRT depth 2	高穿深度 2	RW	U16	1	10	%Vn	[1000,1400]	
42905	A799	maintenance time 2	维持时间 2	RW	U16	1	1	10ms	[0,65000]	
42906	A79A	HVRT depth 3	高穿深度 3	RW	U16	1	10	%Vn	[1000,1400]	
42907	A79B	maintenance time 3	维持时间 3	RW	U16	1	1	10ms	[0,65000]	

- ➢ S16, represents a 16-bit signed number
- ➢ U16, represents a 16-bit unsigned number
- ➢ U32, represents a 32-bit unsigned number
- ➢ S32, represents a 32-bit signed number
- ➢ RO: Read Only   WO: Write Only   R/W: Read/Write
- ➢ Register setting range column [0,0] indicates that there is no set range limit. If there is a special description in the remarks, the description shall prevail
- ➢ Register setting range indicates the data range that can be filled in by communication. The actual setting range may vary slightly according to different models. The data result returned by the actual MODBUS write data frame shall prevail

Table 8-2: MPPT definition:

Model							
HTN (GW250KN-HT)	MPPT1	组串1	Str 1	Non-HTN GW250K-HT	MPPT1	组串1	Str 1
		组串2	Str 2			组串2	Str 2
		组串3	Str 3		MPPT2	组串1	Str 3
	MPPT2	组串1	Str 4			组串2	Str 4
		组串2	Str 5		MPPT3	组串1	Str 5
		组串3	Str 6			组串2	Str 6
	MPPT3	组串1	Str 7		MPPT4	组串1	Str 7
		组串2	Str 8			组串2	Str 8
		组串3	Str 9		MPPT5	组串1	Str 9
	MPPT4	组串1	Str 10			组串2	Str 10
		组串2	Str 11		MPPT6	组串1	Str 11
		组串3	Str 12			组串2	Str 12
	MPPT5	组串1	Str 13		MPPT7	组串1	Str 13
		组串2	Str 14			组串2	Str 14
		组串3	Str 15		MPPT8	组串1	Str 15
	MPPT6	组串1	Str 16			组串2	Str 16
		组串2	Str 17		MPPT9	组串1	Str 17
		组串3	Str 18			组串2	Str 18
	NA	NA	NA		MPPT10	组串1	Str 19
	NA	NA	NA			组串2	Str 20
	NA	NA	NA		MPPT11	组串1	Str 21
	NA	NA	NA			组串2	Str 22
	NA	NA	NA		MPPT12	组串1	Str 23
	NA	NA	NA			组串2	Str 24

Table 8-3: Fault definition

Main DSP fault

Bit NO	decimalism	hexadecimal	Error message	Description	Solution
Bit31	2147483648	0x80000000	SPI Fail (internal communication fault)	内部通讯异常	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit30	1073741824	0x40000000	EEPROM R/W Fail	存储读写异常	EEPROM cannot be read or written
Bit29	536870912	0x20000000	Fac Fail (AC side frequency exceed limit)	电网频率超限	The grid frequency is out of tolerable range
Bit28	268435456	0x10000000	DC SPD Fail	直流防雷失效	Inverter suffering from lighting strike
Bit27	134217728	0x08000000	Night SPS Fault	夜间 SPS 异常	Device Exception
Bit26	67108864	0x04000000	04000000	04000000	Please contact after sales.
Bit25	33554432	0x02000000	Relay Chk Fail	继电器自检异常	1.Cable between control board and power board (for DT) is not tight.|2.Neutral & ground cable are not connected well on AC side. |3.Control board problem.
Bit24	16777216	0x01000000	BUS-start Fail	母线软启异常	1.Cable between control board and power board (for DT) is not tight.|2.Neutral & ground cable are not connected well on AC side. |3.Control board problem.
Bit23	8388608	0x00800000	OVGR Fault	OVGR 故障	1.The total voltage of PV string is Lower than min DC input voltage.|2.There is a problem of control board.

Bit22	4194304	0x00400000	Pv Reverse Fault	PV 反接故障	One of the PV string is reverse
Bit21	2097152	0x00200000	Night BUS Fault	夜间供电异常	Night BUS Fault
Bit20	1048576	0x00100000	CPLD Error	CPLD 报错	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Inverter Inside components fail.
Bit19	524288	0x00080000	DCI High	直流分量高	Inverter detects a higher DC componnet in AC output.
Bit18	262144	0x00040000	Isolation Fail	绝缘阻抗低	1.The Ground cable of panels is not connected or not connected well.|2.DC cable is broken.|3.Neutral & ground cable are not connected well on AC side.|4.The ISO failure happens on rainy days or early morning or sunset, when the humidity is comparatively heavy.
Bit17	131072	0x00020000	Vac Fault (AC side Voltage exceed limit)	电网电压超限	1.Safety country of Inverter is set wrong.|2.Grid voltage is not stable.|3.AC (to grid) cable too small or too long which makes resistance value is high.|4.AC cables are not connected well, which cause a abnormal voltage on AC side.
Bit16	65536	0x00010000	External Fan Fail	外风扇异常	1.External fan is blocked by something.|2.Fan cable is not conneced well in the inverter.
Bit15	32768	0x00008000	GFCI Chk Fail	漏电流自检异常	GFCI value comes to a high level during checking.
Bit14	16384	0x00004000	AFCI Fault	直流拉弧故障	AFCI Fault
Bit13	8192	0x00002000	Overtemp.	过温保护	1.Inverter stays in a high-temperature envioronment for long time.|2.Installing place is not good for cooling system working.
Bit12	4096	0x00001000	IFan Fail	内风扇异常	1.Internal fan is blocked by something.|2.Fan cable is not conneced well in the inverter.
Bit11	2048	0x00000800	DC Bus High	母线电压高	1.The total voltage of PV string is higher than max DC input voltage.|2.Inverter Inside components fail.
Bit10	1024	0x00000400	Ground I Fail	残余电流保护	1.Neutral & ground cable are not connected well on AC side.|2.The Ground I Failure happens on rainy days or early morning or sunset, when the humidity is comparatively heavy.
Bit9	512	0x00000200	Utility Loss	电网断电	1.Grid power fails.|2.AC connection is not good.|3.AC breaker fails 4.Grid is not connected.
Bit8	256	0x00000100	AC HCT Fail	交流传感器故障	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit7	128	0x00000080	Relay Dev Fail	继电器故障	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit6	64	0x00000040	GFCI Fail	漏电流设备故障	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit5	32	0x00000020	DC Bus Low	母线电压低	1.The total voltage of PV string is Lower than min DC input voltage.|2.There is a problem of control board.
Bit4	16	0x00000010	AC SPD Fail	交流防雷失效	Inverter suffering from lighting strike

Bit3	8	0x00000008	DC Switch Fail	直流开关超限	DC trip switch trip times overrun
Bit2	4	0x00000004	Ref 1.5V Fail	1.5V 基准超限	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit1	2	0x00000002	AC HCT Chk Fail	交流自检异常	1.An occasional situation, caused by external factors like external magnetic field etc.|2.It is possible that internal component failure occurs.
Bit0	1	0x00000001	Slave DSP Error	副 DSP 报错	The Slave DSP have Error message

Slave DSP fault

Bit NO	decimalism	hexadecimal	Error message	Description	Solution
Bit31	2147483648	0x80000000	PID Fault	PID功能故障	1.Poor system grounding | 2.PID module malfunction
Bit30	1073741824	0x40000000	CPLD Error	CPLD 报错	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Inverter Inside components fail.
Bit29	536870912	0x20000000	Even Mppt OCP	奇数路硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit28	268435456	0x10000000	Odd Mppt OCP	偶数路硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit27	134217728	0x08000000	08000000	08000000	Please contact after sales.
Bit26	67108864	0x04000000	04000000	04000000	Please contact after sales.
Bit25	33554432	0x02000000	02000000	02000000	Please contact after sales.
Bit24	16777216	0x01000000	01000000	01000000	Please contact after sales.
Bit23	8388608	0x00800000	00800000	00800000	Please contact after sales.
Bit22	4194304	0x00400000	PV soft Over Current	面板过流	one of the PV is over current
Bit21	2097152	0x00200000	Model Error	机型识别错误	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit20	1048576	0x00100000	00100000	00100000	Please contact after sales.
Bit19	524288	0x00080000	Pv Short Failure	PV 短路故障	Pv Short Failure
Bit18	262144	0x00040000	BUS-start Fail	母线软启异常	1.The total voltage of PV string is Lower than min DC input voltage.|2.There is a problem of control board.
Bit17	131072	0x00020000	PV Over Voltage	面板电压过高	The total voltage (open-circuit voltage) of each PV string is higher than the max DC input voltage of the inverter.
Bit16	65536	0x00010000	PV Voltage Low	面板电压过低	The total voltage of each PV string is lower than the min DC input voltage of the inverter.
Bit15	32768	0x00008000	PV HCT Fail	直流 HCT 异常	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit14	16384	0x00004000	Non-feeding OCP	非运行状态过流	PV over current while Invter is stopped
Bit13	8192	0x00002000	Bus Unbalance	母线电压不平衡	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit12	4096	0x00001000	DC Bus High	母线电压高	1.The total voltage of PV string is higher than max DC input voltage.|2.Inverter Inside components fail.

Bit11	2048	0x00000800	PV12 over Current	PV12 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit10	1024	0x00000400	PV11 over Current	PV11 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit9	512	0x00000200	PV10 over Current	PV10 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit8	256	0x00000100	PV9 over Current	PV9 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit7	128	0x00000080	PV8 over Current	PV8 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit6	64	0x00000040	PV7 over Current	PV7 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit5	32	0x00000020	PV6 over Current	PV6 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit4	16	0x00000010	PV5 over Current	PV5 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit3	8	0x00000008	PV4 over Current	PV4 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit2	4	0x00000004	PV3 over Current	PV3 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit1	2	0x00000002	PV2 over Current	PV2 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.
Bit0	1	0x00000001	PV1 over Current	PV1 硬件过流	1.An occasional situation, caused by external factors like external magnetic field etc.|2.Control board has a problem.

Table 8-4: Working status

BIT NO	Status	Description
bit0	Standby	it is equivalent to the "wait", and the self-check "check" is reduced to the "wait"
bit1	Connecting to grid	it is equivalent to the "Normal" state; bit1 and bit2 are set at the same time during normal grid-connection
bit2	Normal connecting to grid	it is equivalent to the "Normal" state; bit1 and bit2 are set at the same time during normal grid-connection
bit3	Normal connecting to grid with power limit	It is under normal status but it is also under power scheduling/limit. bit1 and bit3 are set at the same time when the power is limited and derated
bit4	Normal connecting to grid with self-power limit	It is under normal status but it is also under power limit due to self-reason like high temperature, high voltage, low voltage etc. bit1 and bit4 are set at the same time when the power is limited and derated
bit5	Off	Same with bit 8
bit6	Fault	
bit7	Off with power limit	This bit is not in use yet
bit8	Off	In off status due to off command.
bit9	Checking	This bit is not in use yet

9. Function description

9.1 Active power control

No	Function	Modbus address	Remark
1	Active power control	41480	Saved
		42408	Not saved
2	0 power export	41327	Enable
		41328	Up-Power setting, saved
		41336	Up-power % setting, saved
3	Max. Power limit	41380	Saved
4	Max. Current limit	41383	Saved

Remark: "Saved" means the setting will be saved in inverter, the setting is still valid even the inverter restart. "Not saved" means the setting will loss after inverter restart.

9.1.1 Active power % control

The register 41480 (saved) & 42408 (not saved) is to limit the active power.

41480 address setting will be saved in inverter, which means even the inverter restart, the setting is still valid, while 42408 setting will not be saved in inverter, when the inverter restart, it will come back to default value.

41804 is the address for slope of power control. The default value is 0.

9.1.2 0 power export

When customer need to use 0 power export function, first you have to enable it by 41327, and then set the up-power.

a)   Enable the 0 power function: 41327。

b)   Up-power value setting: 41328。

c)   Up-power % setting: 41336。

9.2 Reactive power control

No	Function	Modbus address	Remark
1	Reactive power % control	41484	Saved
		42419	Not saved
2	PF control	41481	Saved
		42420	Not saved
3	Reactive power value control	41482	Saved
4	Night SVG	42441	Enable address, saved

Remark: "Saved" means the setting will be saved in inverter, the setting is still valid even the inverter restart.

9.2.1 Reactive power control

The register 41484 (saved) & 42419 (not saved) is to control the reactive power.

41484 address setting will be saved in inverter, which means even the inverter restart, the setting is still valid, while 42419 setting will not be saved in inverter, when the inverter restart, it will come back to default value 0.

Reactive power scheduling can be in (first level) low-pass filtering(LFP) mode, and the parameters can be set by modbus(address: 41662)

9.2.2 PF control

There are two address to set the PF, 41481 (saved) & 42420 (not saved)

9.2.3 Reactive power real value control

Address 41482 can set the value of reactive power.

9.2.4 Night SVG function

9.2.4.1 Function description

a) Only support HT1500 (GW250K-HT/GW250KN-HT)

b) 42441 address set to 1 to enable the function, and the inverter will run night SVG immediately.

c) 42442 enabled (set to 1, default is 0), inverter will run as per night SVG power value setting address 42444 (control in %, default) & 42446 (control in value). Otherwise, the inverter will run according to power scheduling command (41482, 41484, 42419)

d) The default value of 42443 is 1, inverter will response the value set in 42446. Set 42443 to 0, the inverter will run according to 42444.

e) When the 42442 enabled, the night SVG function will generate reactive power as per (41482, 41484 or 42419), e.g. when the SVG function enabled, the inverter is generating reactive power as per 41482, 41484 or 42419, and when operator set value 42444 or 42446, the inverter will generate reactive power according to 42444 or 42446.

9.2.4.2 Logic diagram
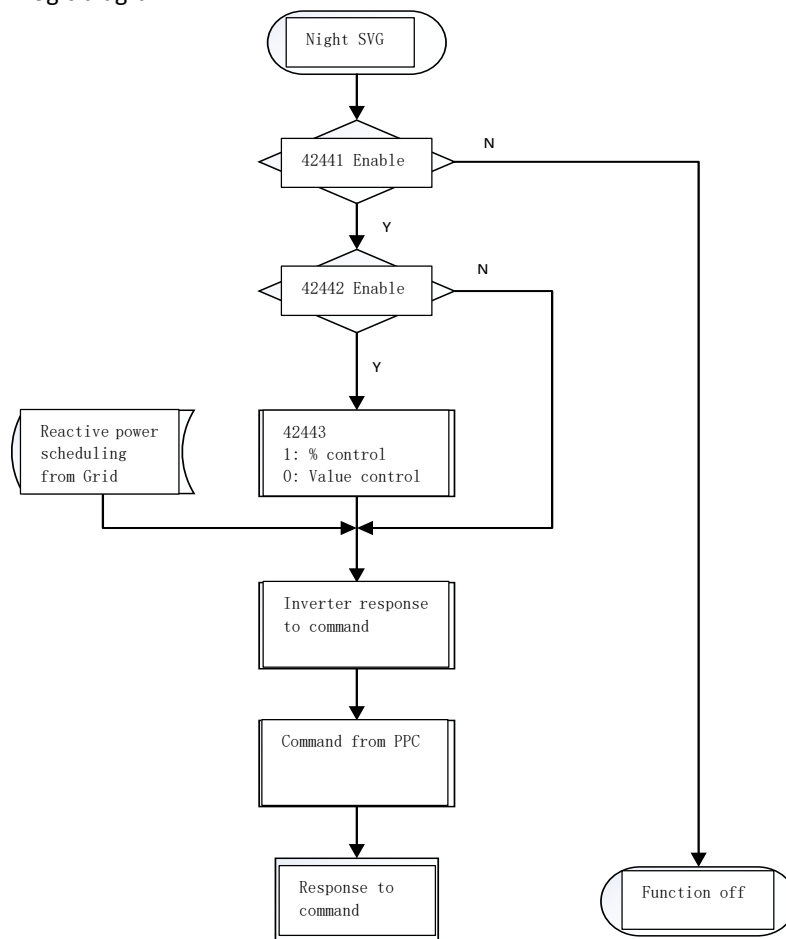
9.3 Safety curves

No	Function	Address	Remark
1	PU curve	41680	Enable switch, saved
2	OF derating & UF derating	41620	Enable switch, saved
3	QU curve	41650	Enable switch, saved
4	cos φ (P) curve	41600	Enable switch, saved
5	QP curve	41700	Enable switch, saved

Remark: "Saved" means the setting will be saved in inverter, the setting is still valid even the inverter restart.

9.3.1 PU (Active-reactive) curve

PU curve is required by safety code of different countries. The inverter comply with the safety code by default. Customer can revise it according to actual use.
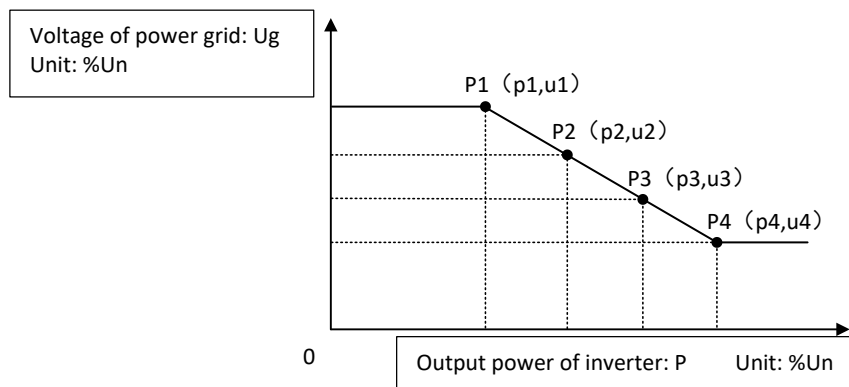
Note: Pmax is the maximum output power in PU curve of Belgium.
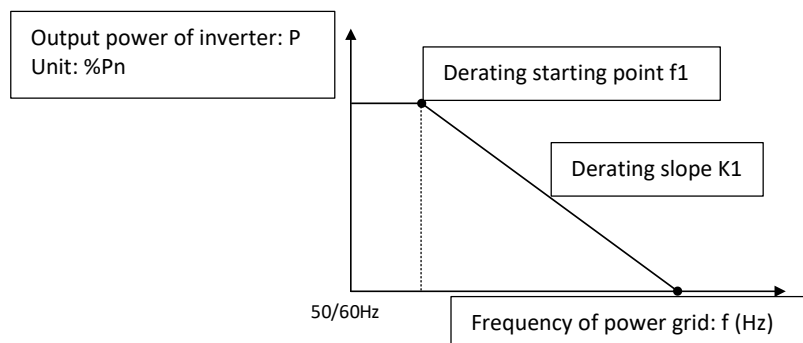
9.3.2 Power derating against high frequency & Power raising against low frequency

The power derating against high frequency & power raising against low frequency function is required by safety code of different countries. The inverter will activate the function by default. Customer can revise it according to actual use.
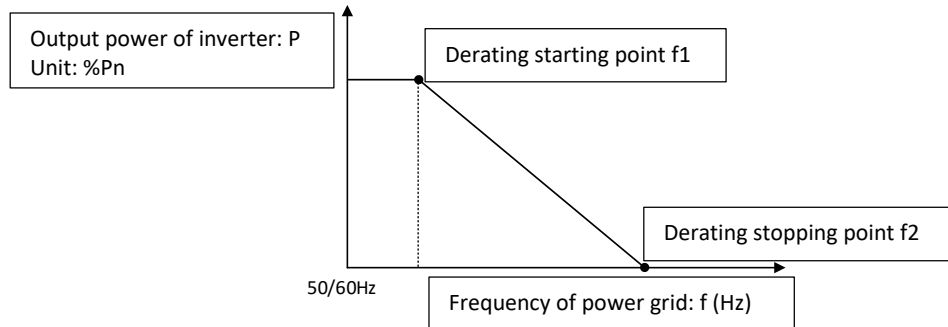
9.3.2.1 Power derating against high frequency

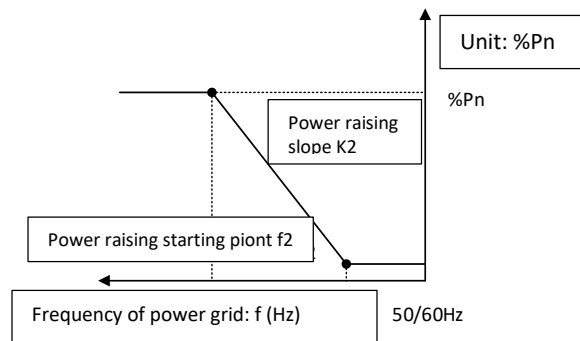It is different from different country. Normally it is divide to ramp mode and hysteresis mode.

Following picture shows ramp mode. If the frequency f>f1, the output power will derating as per the slope K1, until the power derate to 0. The unit of K1 is %Pref, Pref value is different according to different safety code, can be set by 41634.

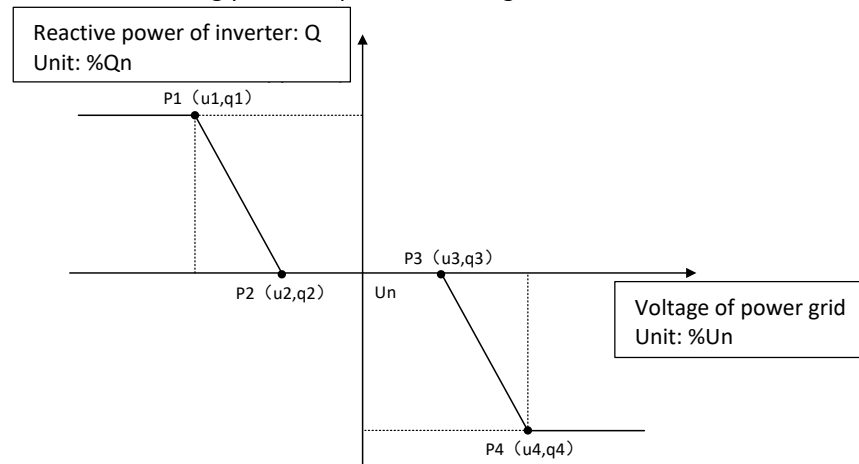Following picture is hysteresis mode. If f>f1, the inverter start derate, if f>f2, the inverter derate to 0.

Output power of inverter: P
Unit: %Pn

Derating starting point f1

Derating stopping point f2

50/60Hz

Frequency of power grid: f (Hz)

9.3.2.2 Power raising against low frequency

Unit: %Pn

%Pn

Power raising slope K2

Power raising starting piont f2

Frequency of power grid: f (Hz)

50/60Hz

As indicating in above picture, when f<f2, the output power of inverter will raise as per slope K2. The unit of slope is %Pref, Pref value is different according to different safety code, can be set by 41634.

9.3.3 QU(Reactive power - voltage) curve

QU curve is required by safety code of different countries. The inverter comply with safety code by default. Customer can revise it accordingly. The set point is showing below.

Reactive power of inverter: Q
Unit: %Qn

P1 (u1,q1)

P2 (u2,q2)

P3 (u3,q3)

Un

Voltage of power grid
Unit: %Un

P4 (u4,q4)

9.3.4 cos φ (P) curve & QP curve

cos φ (P) curve and QP curve both are active power-reactive power curve. cos φ (P) curve determine PF according to output of active power. QP curve determine the reactive power according to output of active power. Please refer to the picture below.

cos φ (P) setting point

QP setting point
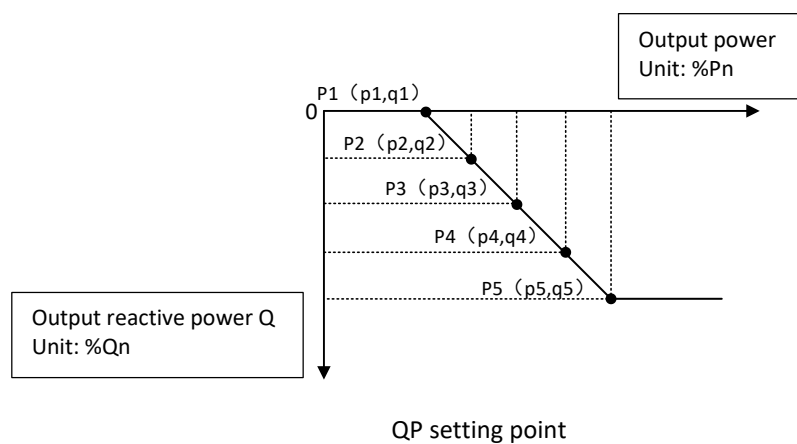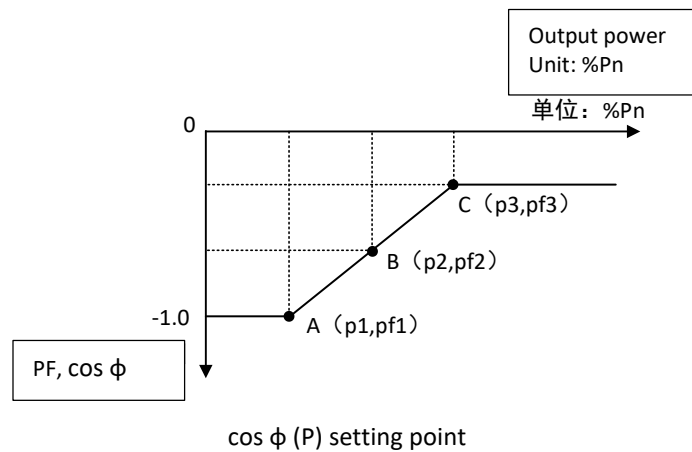
10. Example

10.1 Active power control (%)

Command

Inverter address	Write function	Initial address		Address number	Bit qty	Data		CRC	
F7H	10H	A2H	08H	00H,01H	02H	00H	32H	8AH	A3H

Limit the max. power to 50% the rated power.

Reply from inverter

Inverter address	Write function	Initial address		Address number	CRC	
F7H	10H	A2H	08H	00H,01H	B7H	25H

10.2 Read active power value (%)

Command

Inverter address	Read function	Initial address		Address number	CRC	
F7H	03H	A2H	08H	00H,01H	32H	E6H

Reply from inverter

Inverter address	Read function	Bit qty	Data high	Data low	CRC	
F7H	03H	02H	00H	32H	F1H	84H

The maximum power is set to 50% the rated power

10.3 Remote measure active power

Command

Inverter address	Read function	Initial address		Address number	CRC	
F7H	03H	7DH	50H	00H,02H	C8H	E0H

Reply from inverter

Inverter address	Read function	Bit qty	16 Bit high		16 Bit low		CRC	
F7H	03H	04 H	00H	00H	04H	4CH	6FH	09H

It means the active power is 1110W

10.4 Set reactive power (%)

Command

Inverter address	Write function	Initial address		Address number	Bit qty	Data		CRC	
F7H	10H	A2H	0CH	00H,01H	02H	00H	0AH	8AH	F5H

Set reactive power 10% (10% of rated power)

Reply from inverter

Inverter address	Write function	Initial address		Address number	CRC	
F7H	10H	A2H	0CH	00H,01H	F6H	E4H

10.5 Read reactive power (%)

Command

Inverter address	Read function	Initial address		Address number	CRC	
F7H	03H	A2H	0CH	00H,01H	73H	27H

Reply from inverter

Inverter address	Read function	Bit qty	Data high	Data low	CRC	
F7H	03H	02H	00H	0AH	F0H	56H

It means the reactive power is set 10% of rated power

10.6 Remote measure reactive power

Command

Inverter address	Read function	Initial address		Address number	CRC	
F7H	03H	7DH	52H	00H,02H	69H	20H

Reply from inverter

Inverter address	Read function	Bit qty	16 Bit high		16 Bit low		CRC	
F7H	03H	04H	00H	00H	07H	D8H	6EH	56H

It means current reactive power is 2008Var

10.7 Set PF

Command

Inverter address	Write function	Initial address		Address number	Bit qty	Data		CRC	
F7H	10H	A2H	09H	00H,01H	02H	00H	5AH	8AH	9CH

Set PF to +0.9

Reply from inverter

Inverter address	Write function	Initial address		Address number	CRC	
F7H	10H	A2H	09H	00H,01H	E6H	E5H

10.8 Read PF

Command

Inverter address	Read function	Initial address		Address number	CRC	
F7H	03H	A2H	09H	00H,01H	63H	26H

Reply from inverter

Inverter address	Read function	Bit qty	Data high	Data low	CRC	
F7H	03H	02H	00H	5AH	F0H	6AH

It means the PF is 90, i.e. +0.9