

## CPS Inverter Model Data Mapping Specification For 403X

Status	Draft
Applicable Models	50kW/60kW Inverter
Min Required Firmware	V1.18
Modified By	Liu Kai
Date	2017.3.2

### ABSTRACT

This document describes the Shanghai Chint Powr System(CPS) Inverter model specificaton

### Change history

Date	Versio	Modification	Author
2012-7-	0.1	The initial version	Jake Lee
2012-8-7	0.2	Update the data mapping	Jake Lee
2012-9-25	0.3	1) Add CEI standard RW registers. 2) Add the descriptions for DDH and addressing	Jake Lee
2012-11-	0.4	Modify the register 0x0005 DD_MachVersion to	Jeffrey
2012-12-	0.4C	Add TFMaxTrip setting item	Jakelee
2013-1-28	0.4D	Add remote dispatch parameters , FaultCode3, FaultCode4 and the unit of VLvrtStart	zhangzf
2013-3-2	0.5	Modify the units of DCIMax and GFCI	zhangzf
2013-4-1	0.6	Add Qac RatingP/Q/PF for MPU	Jake Lee
2015-1-1	0.61	Add OverFreqDerat and LVRT	Puyao
2016-5-13	draft	Add Holding[0x105a] register for enable to ARC option Add Holding[0x105b] register for clearing ARC fault Modify the input[0x0001] register to LCD bootloader and ARC versions Modify the input[0x0002] register to ARCStatus/ PvinputConfig	Wangkai
		Add Input[0x003c-0x0040] registers for PIDbox	Wangkai
		Add Acquisition Board for 1MW Three-Level Inverter	shengshuang
2016-6-2	draft	Modify the holding registers For 60 kW Inverter	shengshuang
2016-07-	draft	add chapter "Operating Instructions"	shengshuang
2016-10-	0.7	Modify some parameters' range	Liu Kai
2016-12-	0.8	Modify group 10 and fault code	Liu Kai
2016-12-	0.9	add 0x4034 for 60kW inverter embedded with new MCU	Liu Kai
2016-12-27	0.10	Address 0x0042 PVdetection Address 0x0800 for PV detection board Address 0x1200 for PV detection board	Liu Kai
2017-2-24	0.11	Remove other machine models and redundant information	Liu Kai

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**⚠ ESSENTIAL COMPLIANCE INFORMATION**

(1). In the CPS MODBUS protocol, implementations should leave unused or unsupported data points set to the “Not Implemented” value specified in the model mapping. The Not Implemented value for different data type has different value, here are the defined:

- Not Implemented for a int8 is 0x80.
- Not Implemented for a uint8 is 0xFF.
- Not Implemented for a int16 is 0x8000.
- Not Implemented for a uint16 is 0xFFFF.
- Not Implemented for a int32 is 0x80000000.
- Not Implemented for a uint32 is 0xFFFFFFFF.
- Not Implemented for a string is 0x00.

(2). **CPS Units:** Units and Scale Factors are defined by CPS Units. As an alternative to floating point format, values are represented by integer values with a signed scale factor applied. For example:

Start	End	Size	R/W	Name	Type	CPS Units	Contents	Description
0x001F	0x001F	1	RO	Uab	uint16	0.1V		Grid voltage Uab

The Uab unit is V, if current real-time value is Uab=389.5V, the value Uab in register 0x001F is 3895 decimal (0x0F37 hex). So 0.1V indicates that the Uint is V, and Scale factor was Magnified 10 times, so real-time value is 3895/10=389.5

(3). **Scale Factor:** As an alternative to floating point format, values are represented by integer values with a signed scaled factor applied. The scale factor explicitly shifts the decimal point to the left (negative value) or the right (positive value). Scale factors had been fixed and specified in the documentation of a value. Scale factor signed range:-10----10. For example

Start	End	Size	R/W	Name	Type	Unit	Scale Factor	Description
0x001F	0x001F	1	RO	Uab	uint16	V	-1	Grid voltage Uab

The Uab unit is V, if current real-time value is Uab=389.5V, the value Uab in register 0x001F is 3895 decimal (0x0F37 hex).Scale Factor is -1, it explicitly shifts the decimal point to the left one bit, then real-time value is 389.5,

**(4) Data Encoding**

The MODBUS specification is not explicit on how to encode numbers other than 16-bit integers. Differences do exist between one manufacturer’s implementation and another’s.

**32-bit integer Value**

Values are stored in big-endian order per the MODBUS specification and consist of a single register.

MODBUS Register	1		2	
byte	0		1	2
bits	31---24		23---16	15---8
				7---0

**64-bit integer Value**

64-bit integers are stored using for registers in big-endian order.

MODBUS Register	1		2	
byte	0		1	2
bits	63---56		55---48	47---40
				39---32

MODBUS Register	3		4	
byte	4		5	6
				7

bits	31---24	23---16	15---8	7---0
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**String Value**

Store variable length string values in a fixed size register range using a NULL(0 value)to terminate or pad the string. For example, up to 14 characters can be stored in 7 contiguous registers as follows:

MODBUS Register	1		2		3		4		5		6		7	
byte	0	1	2	3	4	5	6	7	8	9	10	11	12	13
character	S	C	1	0	0	K	T	L	/	C	N	0	0	0

Not\_Implemented value:all registers filled with 0x0000.

(5) Basic register address is 0x0000.

# 1 Abbreviations

ADU	Application Data Unit
IP	Internet Protocol
MB	MODBUS
MBAP	MODBUS Application Protocol
PDU	Protocol Data Unit
TCP	Transport Control Protocol
CPS	Chint Power System
uint8	unsigned char
uint16	unsigned int
uint32	unsigned long
int8	signed char
int16	signed int
int32	signed long

## 2 Protocol Description

1、 Protocol Type: Modbus RTU

2、 Communication Port Parameters:

BaudRate: optional

DataBits: 8

Parity: None

StopBit: 1

DTR: Disable

RTS: Disable

3、 Frame Format:

start	Addr	Function Code	Data	CRC16	end
T1-T2-T3-T4	1Byte	1Byte	N	2Byte	T1-T2-T3-T4

### 3 Inverter Input Registers Data Mapping

The MODBUS read function code is 0x04, and the basic register address is 0x0000.

**Table 3-1 Input Registers Data Mapping**

Start	End	Size	R/W	Name	Type	CP S Units	Unit	Scale factor	Min value	Max value	Contents	Description
0x0000	0x0000	1	RO	Device	uint16	1	N/A	0	N/A	N/A	0x4032 0x4034	a value that uniquely identifies the type of device model, 0x4032 for 60kW inverter embedded with old MCU, 0x4034 for 60kW inverter embedded with new MCU,
0x0003	0x0003	1	RO	RegNum	uint16	1	registers	0	actual value	actual value	actual value	Number of readable registers (R/W=RO) supported by this device, count from the register ProVer to the last input register, and one register consists of 16-bit.
0x0004	0x0004	1	RO	ProVer	uint16	0.01	N/A	-2	N/A	N/A	actual value	a value that identifies the latest supported communication protocol version.
0x0005	0x0005	1	RO	MinorVer	uint16	0.01	N/A	-2	N/A	N/A	actual value	A manufacturer specific value that identifies the minor version of this device; The data format of FirmVer is 0xAABB. AA indicates DSP firmware revision, and BB indicates MCU firmware revision.
0x0006	0x0009	4	RO	SN	uint64	BCD	N/A	0	N/A	N/A	actual value	a manufacturer specific value that uniquely identifies this device within the manufacturer name space. Remark: Serial number is composed of 16 characters(8 bytes), the most significant 3 characters is not used, only used the left 13 characters. Such as 0X0001010091114001, it represents the inverter serial number is 1010091114001

0x000a	0x0013	10	RO	model	string(20)	1	N/A	0	N/A	N/A	actual value	a value that identifies the current device model serial descriptor, e.g. SC20KTL-DO/IT
0x0014	0x0014	1	RO	RWReg Sum	uint16	1	N/A	0	actual value	actual value	actual value	number of R/W registers supported by this device
0x0015	0x0015	1	RO	RWReg Add	uint16	1	N/A	0	actual value	actual value	0x1000	R/W register start address offset
0x0016	0x0017	2	RO	TYield	uint32	1 kWh	Kwh	0	0	0xFFF	actual value	Total energy to grid
0x0018	0x0018	1	RO	DYield	uint16	0.1kWh	Kwh	-1	0	0xFFF	actual value	The accumulated kWh of that day
0x0019	0x0019	1	RO	Eff	uint16	0.01%	%	-4	0	1000	actual value	Inverter efficiency. When reading this register is 0x1F40, representing $Eff = 0x1F40 * 0.0001 = 0.8 = 80\%$
0x001A	0x001A	1	RO	PF	int16	0.001	N/A	-3	actual value	1000	actual value	Power factor. When reading this register is 0x0320, representing $PF = 0x0320 * 0.001 = 0.8$
0x001B	0x001B	1	RO	Pmax	uint16	0.1kW	Kw	-1	actual value	actual value	actual value	AC maximum active power of that day
0x001C	0x001C	1	RO	RunT	uint16	0.1Min	Min	-1	actual value	actual value	actual value	The cumulative time from the start feeding grid to the current
0x001D	0x001D	1	RO	Pac	uint16	0.1kW	Kw	-1	actual value	actual value	actual value	AC active power
0x001E	0x001E	1	RO	Sac	uint16	0.1kVA	KVA	-1	actual value	actual value	actual value	AC Apparent power
0x001F	0x001F	1	RO	Uab	uint16	0.1V	V	-1	actual value	actual value	actual value	Grid voltage Uab
0x0020	0x0020	1	RO	Ubc	uint16	0.1V	V	-1	actual value	actual value	actual value	Grid voltage Ubc

0x0021	0x0021	1	RO	Uca	uint16	0.1 V	V	-1	actual value	actual value	actual value	Grid voltage Uca
0x0022	0x0022	1	RO	Ia	uint16	0.1 A	A	-1	actual value	actual value	actual value	Grid A phase current
0x0023	0x0023	1	RO	Ib	uint16	0.1 A	A	-1	actual value	actual value	actual value	Grid B phase current
0x0024	0x0024	1	RO	Ic	uint16	0.1 A	A	-1	actual value	actual value	actual value	Grid C phase current
0x0025	0x0025	1	RO	Upv1	uint16	0.1 V	V	-1	actual value	actual value	actual value	PV voltage
0x0026	0x0026	1	RO	Ipv1	int16	0.1 A	A	-1	actual value	actual value	actual value	PV current
0x0027	0x0027	1	RO	Upv2	uint16	0.1 V	V	-1	actual value	actual value	actual value	PV2 voltage
0x0028	0x0028	1	RO	Ipv2	int16	0.1 A	A	-1	actual value	actual value	actual value	PV2 current
0x0029	0x0029	1	RO	Upv3	uint16	0.1 V	V	-1	actual value	actual value	actual value	PV3 voltage
0x002A	0x002A	1	RO	Ipv3	int16	0.1 A	A	-1	actual value	actual value	actual value	PV3 current
0x002B	0x002B	1	RO	Freq	uint16	0.1 Hz	Hz	-1	actual value	actual value	actual value	Grid frequency
0x002C	0x002C	1	RO	Tmod	int16	0.1 C	C	-1	actual value	actual value	actual value	Heatsink temperature
0x002D	0x002D	1	RO	Tamb	int16	0.1 C	C	-1	actual value	actual value	actual value	Ambient temperature



0x002F	0x002F	1	RO	Mode	uint16	1	N/A	0	N/A	N/A	actual value	Inverter mode code, for details see Table5-1 "Inverter Work Mode Descriptor"
0x0030	0x0033	4	RO	Time	uint64	BCD	N/A	0	N/A	N/A	actual value	Error timestamp(yyyy-mm-dd-hh-mm-ss-N/A) of model 0, e.g. 0x2012071615181000=2012-7-16 15:18:10
0x0034	0x0034	1	RO	PFault	uint16	1	N/A	0	0	0xFF	actual value	permanent fault code of model 0, for details see Table8-1 or Table8-2 "Fault Code"
0x0035	0x0035	1	RO	Warn	uint16	1	N/A	0	0	0xFF	actual value	Warn code of model 0, for details see Table8-1 or Table8-2 "Fault Code"
0x0036	0x0036	1	RO	Fault0	uint16	1	N/A	0	0	0xFF	actual value	Fault code0 of model 0
0x0037	0x0037	1	RO	Fault1	uint16	1	N/A	0	0	0xFF	actual value	Fault code1 of model 0
0x0038	0x0038	1	RO	Fault2	uint16	1	N/A	0	0	0xFF	actual value	Fault code2 of model 0
0x0039	0x0039	1	RO	Fault3	uint16	1	N/A	0	0	0xFF	actual value	Fault code3 of model 0
0x003A	0x003A	1	RO	Fault4	uint16	1	N/A	0	0	0xFF	actual value	Fault code4 of model 0
0x003B	0x003B	1	RO	Qac	int16	0.1kVA	KVA	-1	actual value	actual value	actual value	AC ractive power
0x0041	0x0041	1	RO	MajorVer	uint16	N/A	N/A	N/A	N/A	N/A	actual value	A manufacturer specific value that identifies the major version of this device; The data format of FirmVer is 0xAABB. AA indicates DSP firmware revision, and BB indicates MCU firmware revision.

## 4 Inverter Holding Registers Mapping

The MODBUS read function code is 0x03, and write function codes are 0x06 and 0x10.

### 1. Holding Registers Area One

**Table 4-1 Holding Registers Area One Data Mapping**

Start	End	Size	R/W	Name	Type	CP Units	Unit	Scale factor	Min value	Max value	Contents	Description
0x1000	0x1000	1	R/W	OnOff	uint16	1	N/A	0	0x5555	0xA555A555A	0x5555/0xA555A	device power on or off command, 0xAAAA power on, 0x5555 power off
0x1001	0x1001	1	R/W	PSet	uint16	0.1%	N/A	-3	0	1000	actual value	Remote electric dispatch Active Power setting value, range [0.0%, 100.0%], E.g. 70.7%, then PSet=0x02c3
0x1002	0x1002	1	R/W	PFSet	int16	0.001	N/A	-3	-1000	8001000	actual value	Remote electric dispatch Power factor Setting, Range [-1.000,-0.800]U[0.800, 1.000], E.g. 0.931, then PFSet=0X03A3; -0.931 PFSet=0xFC5D
0x1003	0x1003	1	R/W	QSet	int16	0.1%	N/A	-1	-600	600	actual value	Remote electric dispatch Reactive Power setting value, range [-100.0%,100.0%], E.g. 70.7%, then QSet=0x02c3
0x1004	0x1007	4	R/W	TimeSet	uint64	BCD	N/A	0	N/A	N/A	actual value	System time setting, format as :yyyy-mm-dd-hh-mm-ss-NUL, E.g. 0x2012071615181000=2012-7-16 15:18:10
0x1046	0x1046	1	R/W	RemoteActivePwDispatchModeOption	uint16	1	N/A	0	N/A	N/A	0:Disable 1:Enable	The enable of Remote dispatch

0x1047	0x1047	1	R/W	RemoteReactivePwModeSelect	uint16	1	N/A	0	N/A	N/A	0 : None 1 : dispatch(remote control) 2 : Q(local EEPROM set) 3 : PF(local EEPROM set) 4 : PF(P) 5 : Q(U)	The reactive mode of Remote dispatch
0x105A	0x105A	1	R/W	EnableARCOption	uint16	1	N/A	0	0	1	0 : Disable 1 : Enable	The enable of ARC option
0x105B	0x105B	1	R/W	ClearARCFault	uint16	1	N/A	0	N/A	N/A	N/A	W: only can write 0xbbbb; R: 0xbbbb=ARCClear successfully; 0xaaaa = ARC clear failurely; 0x5555 = clearing ARC; 0x0000 = no action about ARC
0x1100	0x1103	4	R/W	SN of Communication card	uint64	B C D	N/A	0	N/A	N/A	N/A	a manufacturer specific value that uniquely identifies this device within the manufacturer name space. Remark: Serial number is composed of 16 characters(8 bytes), the most significant 3 characters is not used, only used the left 13 characters. Such as 0X0001010091114001,it represents the inverter serial number is 1010091114001

0x104	0x105	2	R/W	IP of the connected Communication card	uint32	1	N/A	0	N/A	N/A	N/A	Example : 0x0A7A0136 represents the IP address 10.122.1.54
0x106	0x107	2	R/W	Subnet mask	uint32	1	N/A	0	N/A	N/A	N/A	The same as above
0x108	0x109	2	R/W	Default gateway	uint32	1	N/A	0	N/A	N/A	N/A	The same as above
0x10a	0x10b	2	R/W	DNS server	uint32	1	N/A	0	N/A	N/A	N/A	The same as above
0x10c	0x10d	1	R/W	Address range	uint16	1	N/A	0	1	8	N/A	The address range that communication card is used. value=1: 1-32 value=2: 33-64 value=3: 65-96 value=4: 97-128 value=5: 129-160 value=6: 161-192 value=7: 193-224 value=8: 225-255

## 4.2 Holding Registers Area Two

**Table 4-2 Assignment of Holding Register Groups**

Address Range	Group Name
0x2000 ~ 0x20FF	Grid Protection Parameters
0x2100 ~ 0x21FF	Active Power Derating Parameters
0x2200 ~ 0x22FF	Reactive Power Derating Parameters
0x2300 ~ 0x23FF	Arc Detection Parameters
0x2400 ~ 0x24FF	LVRT/HVRT Parameters
0x2500 ~ 0x25FF	Others Parameters
0x2600 ~ 0x26FF	Enable/disable control Parameters
0x2700 ~ 0x27FF	Control Command
0x2900 ~ 0x29FF	Inverter Basic Information

**Table 4-3 Holding Registers Data Mapping**

Start	End	Size	R/W	Name	Type	CPS Units	Unit	Scale factor	Min value	Max value	Contents	Description
<b>Group 0 Grid Protection Parameters</b>												

0x2000	0x2000	1	RW	GridV.Max1	uint16	0.01%	%	-2	10000	13500	actual value	The first maximum operational grid voltage
0x2001	0x2001	1	RW	VolMaxTripTime_1	uint16	0.01s	s	-2	0	65500	actual value	The first maximum grid voltage trip time
0x2002	0x2002	1	RW	GridV.Max2	uint16	0.01%	%	-2	10000	13500	actual value	The 2nd maximum operational grid voltage
0x2003	0x2003	1	RW	VolMaxTripTime_2	uint16	0.01s	s	-2	0	65500	actual value	The 2nd maximum grid voltage trip time
0x2004	0x2004	1	RW	GridV.Max3	uint16	0.01%	%	-2	10000	13500	actual value	The 3rd maximum operational grid voltage
0x2005	0x2005	1	RW	VolMaxTripTime_3	uint16	0.01s	s	-2	0	65500	actual value	The 3rd maximum grid voltage trip time
0x2006	0x2006	1	RW	GridV.Min1	uint16	0.01%	%	-2	3000	10000	actual value	The first minimum operational grid voltage
0x2007	0x2007	1	RW	VolMinTripTime_1	uint16	0.01s	s	-2	0	65500	actual value	The first minimum grid voltage trip time
0x2008	0x2008	1	RW	GridV.Min2	uint16	0.01%	%	-2	3000	10000	actual value	The 2nd minimum operational grid voltage
0x2009	0x2009	1	RW	VolMinTripTime_2	uint16	0.01s	s	-2	0	65500	actual value	The 2nd minimum grid voltage trip time
0x200A	0x200A	1	RW	GridV.Min3	uint16	0.01%	%	-2	3000	10000	actual value	The 3rd minimum operational grid voltage
0x200B	0x200B	1	RW	VolMinTripTime_3	uint16	0.01s	s	-2	0	65500	actual value	The 3rd minimum grid voltage trip time
0x200C	0x200C	1	RW	VMaxRcov	uint16	0.01%	1%	-2	8000	13500	actual value	The upper limit grid voltage recovery

0x2 0 0 D	0x2 0 0 D	1	R W	VMinRcov	uint 16	0.01 %	%	-2	2000	10000	actu a l valu e	The lower limit grid voltage recovery
0x2 00E	0x2 00E	1	R W	VRcovT	uint 16	0.01s	s	-2	0	65500	actu a l valu e	The time of grid voltage recovery
0x2 00F	0x2 00F	1	R W	GridF.Max1	uint 16	0.01 Hz	H z	-2	5000 @50 Hz 6000 @60 Hz	5 5 0 0 @50H z 6 6 0 0 @60H z	actu a l valu e	The first maximum operational grid frequency
0x2 010	0x2 010	1	R W	FMaxTripTi me_1	uint 16	0.01s	s	-2	0	65500	actu a l valu e	The first maximum grid frequency trip time
0x2 011	0x2 011	1	R W	Gridf.Max2	uint 16	0.01 Hz	H z	-2	5000 @50 Hz 6000 @60 Hz	5 5 0 0 @50H z 6 6 0 0 @60H z	actu a l valu e	The 2nd maximum operational grid frequency
0x2 012	0x2 012	1	R W	FMaxTripTi me_2	uint 16	0.01s	s	-2	0	65500	actu a l valu e	The 2nd maximum grid frequency trip time
0x2 013	0x2 013	1	R W	GridF.Max3	uint 16	0.01 Hz	H z	-2	5000 @50 Hz 6000 @60 Hz	5 5 0 0 @50H z 6 6 0 0 @60H z	actu a l valu e	The 3rd maximum operational grid frequency
0x2 014	0x2 014	1	R W	FMaxTripTi me_3	uint 16	0.01s	s	-2	0	65500	actu a l valu e	The 3rd maximum grid frequency trip time
0x2 015	0x2 015	1	R W	GridF.Min1	uint 16	0.01 Hz	H z	-2	4500 @50 Hz 5400 @60 Hz	5 0 0 0 @50H z 6 0 0 0 @60H z	actu a l valu e	The first minimum operational grid frequency
0x2 016	0x2 016	1	R W	FMinTripTi me_1	uint 16	0.01s	s	-2	0	65500	actu a l valu e	The first minimum grid frequency trip time
0x2 017	0x2 017	1	R W	GridF.Min2	uint 16	0.01 Hz	H z	-2	4500 @50 Hz 5400 @60 Hz	5 0 0 0 @50H z 6 0 0 0 @60H z	actu a l valu e	The 2nd minimum operational grid frequency

0x2018	0x2018	1	RW	FMinTripTime_2	uint16	0.01s	s	-2	0	65500	actual value	The 2nd minimum grid frequency trip time
0x2019	0x2019	1	RW	GridF.Min3	uint16	0.01Hz	Hz	-2	4500@50Hz 5400@60Hz	5500@50Hz 6600@60Hz	actual value	The 3rd minimum operational grid frequency
0x201A	0x201A	1	RW	FMinTripTime_3	uint16	0.01s	s	-2	0	65500	actual value	The 3rd minimum grid frequency trip time
0x201B	0x201B	1	RW	FMaxRcov	uint16	0.01Hz	Hz	-2	4500@50Hz 5400@60Hz	5500@50Hz 6600@60Hz	actual value	The upper limit grid frequency recovery
0x201C	0x201C	1	RW	FMinRcov	uint16	0.01Hz	Hz	-2	4500@50Hz 5400@60Hz	5000@50Hz 6000@60Hz	actual value	The lower limit grid frequency recovery
0x201D	0x201D	1	RW	FRcovT	uint16	0.01s	s	-2	0	65500	actual value	The time of grid frequency recovery
0x201E	0x201E	1	RW	VMaxMovAvg	uint16	0.01%	%	-2	10000	13500	actual value	The upper limit grid voltage of moving average filter
0x201F	0x201F	1	RW	VMaxMovAvgT	uint16	0.01s	s	-2	0	65500	actual value	The trip time of the upper limit grid voltage of moving average filter
0x2020	0x2020	1	RW	VMinMovAvg	uint16	0.01%	%	-2	8000	10000	actual value	The lower limit grid voltage of moving average filter
0x2021	0x2021	1	RW	VMinMovAvgT	uint16	0.01s	s	-2	0	65500	actual value	The trip time of the lower limit grid voltage of moving average filter
0x2022	0x2022	1	RW	VMovAvgRcovT	uint16	0.01s	s	-2	0	65500	actual value	The moving average filter recovery time

0x2023	0x2023	1	RW	VUnbal	uint16	0.01%	%	-2	1	1000	actual value	Unbalance rate of grid voltage
<b>Group 1 Active Power Derating Parameters</b>												
0x2100	0x2100	1	RW	OVDeratStart	uint16	0.01%	%	-2	10000	13500	actual value	The trigger voltage of OverVoltage derating
0x2101	0x2101	1	RW	OVDeratStop	uint16	0.01%	%	-2	10000	11000	actual value	The end voltage of OverVoltage derating
0x2102	0x2102	1	RW	OVDeratRate	uint16	0.1%	%	-1	1	1000	actual value	The rate of OverVoltage derating
0x2103	0x2103	1	RW	OVDeratFilterTime	uint16	1s	s	0	1	90	actual value	The filtering time of OverVoltage derating
0x2104	0x2104	1	RW	OFDeratStart	uint16	0.01 Hz	Hz	-2	5000 @50 Hz 6000 @60 Hz	6000 @50Hz 7200 @60Hz	actual value	The trigger frequency of OverFrequency derating
0x2105	0x2105	1	RW	OFDeratStopOrRate	uint16	0.01 Hz	Hz	-2	5000 @50 Hz 6000 @60 Hz	6000 @50Hz 7200 @60Hz	actual value	The end frequency or Rate of Overfrequency derating (Depends on the specific standard)
0x2106	0x2106	1	RW	OFDeratRate	uint16	0.01%	%	-2	1	10000	actual value	The Rate of Overfrequency derating.
0x2107	0x2107	1	RW	OFDeratRecoveryFre	uint16	0.01 Hz	Hz	-2	4900 @50 Hz 5880 @60 Hz	5500 @50Hz 6600 @60Hz	actual value	The recovery frequency of OverFrequency derating
0x2108	0x2108	1	RW	OFDeratRecoveryT	uint16	1s	s	0	0	1200	actual value	The recovery time of OverFrequency derating
0x2109	0x2109	1	RW	UFDeratStart	uint16	0.01 Hz	Hz	-2	4500 @50 Hz 5400 @60 Hz	5000 @50Hz 6000 @60Hz	actual value	The trigger frequency of UnderFrequency derating



0x2 10A	0x2 10A	1	R W	UFDeratSto pOrRate	uint 16	0.01 Hz	H z	-2	5000 @50 Hz 6000 @60 Hz	6000 @50H z 7200 @60H z	actu a l valu e	The end frequency or Rate of Underfrequency derating (Depends on the specific standard)
0x2 10B	0x2 10B	1	R W	UFDeratRat e	uint 16	0.01 %	%	-2	1	10000	actu a l valu e	The Ratio of Underfrequency derating.
0x2 10C	0x2 10C	1	R W	UFDeratRc ovFre	uint 16	0.01 Hz	H z	-2	4500 @50 Hz 5400 @60 Hz	5000 @50H z 6000 @60H z	actu a l valu e	The recovery frequency of UnderFrequency derating
0x2 10D	0x2 10D	1	R W	UFDeratRc ovT	uint 16	1s	s	0	0	1200	actu a l valu e	The recovery time of UnderFrequency derating
0x2 10E	0x2 10E	1	R W	OTDeratSta rt	uint 16	0.1 °C	°C	-1	0	1000	actu a l valu e	The trigger temperature of OverTemperature derating
0x2 10F	0x2 10F	1	R W	OTDeratSto p	uint 16	0.1 °C	°C	-1	0	1000	actu a l valu e	The end temperature of OverTemperature derating
0x2 110	0x2 110	1	R W	OTDeratRat e	uint 16	0.01 %	1	-2	1	10000	actu a l valu e	The rate of OverTemperature derating

### Group 2 Reactive Power Derating Parameters

0x2 200	0x2 200	1	R W	PF_Local	int1 6	0.001		-3	-100 0 ~ -800	800 ~ 1000	actu a l valu e	Local Power Factor Setting
0x2 201	0x2 201	1	R W	PF_PCurve ActPw1	uint 16	0.1% %	%	-1	0	1000	actu a l valu e	Power of PF(P)Curve point 1
0x2 202	0x2 202	1	R W	PF_PCurve PF1	int1 6	0.001		-3	-100 0 ~ -800	800 ~ 1000	actu a l valu e	PF of PF(P)Curve point 1
0x2 203	0x2 203	1	R W	PF_PCurve ActPw2	uint 16	0.1% %	%	-1	0	1000	actu a l valu e	Power of PF(P)Curve point 2
0x2 204	0x2 204	1	R W	PF_PCurve PF2	int1 6	0.001		-3	-100 0 ~ -800	800 ~ 1000	actu a l valu e	PF of PF(P)Curve point 2

0x2 205	0x2 205	1	R W	PF_PCurve LockInV	uint 16	0.01 %	%	-2	1000 0	11000	actu a l valu e	The trigger voltage of PF(P)Curve
0x2 206	0x2 206	1	R W	PF_PCurve LockOutV	uint 16	0.01 %	%	-2	9000	10000	actu a l valu e	The end voltage of PF(P)Curve
0x2 207	0x2 207	1	R W	Q_UCurveV olt1s	uint 16	0.01 %	%	-2	1000 0	11000	actu a l valu e	Voltage of Q(U)Curve point 1
0x2 208	0x2 208	1	R W	Q_UCurve ReactPw1s	int1 6	0.1%	%	-1	-600	600	actu a l valu e	Reactive power of Q(U)Curve point 1
0x2 209	0x2 209	1	R W	Q_UCurveV olt2s	uint 16	0.01 %	%	-2	1080 0	11000	actu a l valu e	Voltage of Q(U)Curve point 2
0x2 20A	0x2 20A	1	R W	Q_UCurve ReactPw2s	int1 6	0.1%	%	-1	-600	600	actu a l valu e	Reactive power of Q(U)Curve point 2
0x2 20B	0x2 20B	1	R W	Q_UCurveV olt1i	uint 16	0.01 %	%	-2	9000	9500	actu a l valu e	Voltage of Q(U)Curve point 1i
0x2 20C	0x2 20C	1	R W	Q_UCurve ReactPw1i	int1 6	0.1%	%	-1	-600	600	actu a l valu e	Reactive power of Q(U)Curve point 1i
0x2 20D	0x2 20D	1	R W	Q_UCurveV olt2i	uint 16	0.01 %	%	-2	8000	9200	actu a l valu e	Voltage of Q(U)Curve point 2i
0x2 20E	0x2 20E	1	R W	Q_UCurve ReactPw2i	int1 6	0.1%	%	-1	-600	600	actu a l valu e	Reactive power of Q(U)Curve point 2i
0x2 20F	0x2 20F	1	R W	Q_UCurveL ockInP	uint 16	0.1%	%	-1	50	1000	actu a l valu e	The trigger voltage of Q(U)Curve
0x2 210	0x2 210	1	R W	Q_UCurveL ockOutP	uint 16	0.1%	%	-1	50	1000	actu a l valu e	The end voltage of Q(U)Curve
<b>Group 3 ARC Parameters</b>												
0x2 300	0x2 300	1	R W	ArcFactory B1	uint 16	1K	K	0	0	100	actu a l valu e	ArcFactoryB1

0x2 301	0x2 301	1	R W	ArcFactoryI 1	uint 16	1K	K	0	0	100	actu a l valu e	ArcFactoryI1
0x2 302	0x2 302	1	R W	ArcFactory F1	uint 16	1	1	0	0	1000	actu a l valu e	ArcFactoryF1
0x2 303	0x2 303	1	R W	ArcFactory D1	uint 16	1%	%	0	0	100	actu a l valu e	ArcFactoryD1
0x2 304	0x2 304	1	R W	ArcFactory T1	uint 16	1dB	d B	0	0	2000	actu a l valu e	ArcFactoryT1
0x2 305	0x2 305	1	R W	ArcFactory C1	uint 16	1dB	d B	0	0	2000	actu a l valu e	ArcFactoryC1
0x2 306	0x2 306	1	R W	ArcFactory B2	uint 16	1K	K	0	0	100	actu a l valu e	ArcFactoryB2
0x2 307	0x2 307	1	R W	ArcFactoryI 2	uint 16	1K	K	0	0	100	actu a l valu e	ArcFactoryI2
0x2 308	0x2 308	1	R W	ArcFactory F2	uint 16	1	1	0	0	1000	actu a l valu e	ArcFactoryF2
0x2 309	0x2 309	1	R W	ArcFactory D2	uint 16	1%	%	0	0	100	actu a l valu e	ArcFactoryD2
0x2 3 0 A	0x2 3 0 A	1	R W	ArcFactory T2	uint 16	1dB	d B	0	0	2000	actu a l valu e	ArcFactoryT2
0x2 30B	0x2 3 0 B	1	R W	ArcFactory C2	uint 16	1dB	d B	0	0	2000	actu a l valu e	ArcFactoryC2
0x2 30C	0x2 3 0 C	1	R W	ArcFactory PerI1	uint 16	1K	K	0	0	100	actu a l valu e	ArcFactoryPerI1
0x2 3 0 D	0x2 3 0 D	1	R W	ArcFactory PerI2	uint 16	1K	K	0	0	100	actu a l valu e	ArcFactoryPerI2

0x2 30E	0x2 30E	1	R W	ArcFactory PerB1	uint 16	1K	K	0	0	100	actu a l valu e	ArcFactoryPerB1
0x2 30F	0x2 30F	1	R W	ArcFactory PerB2	uint 16	1K	K	0	0	100	actu a l valu e	ArcFactoryPerB2
0x2 310	0x2 310	1	R W	ArcFactory PerC1	uint 16	1%	%	0	0	100	actu a l valu e	ArcFactoryPerC1
0x2 311	0x2 311	1	R W	ArcFactory PerC2	uint 16	1%	%	0	0	100	actu a l valu e	ArcFactoryPerC2
0x2 312	0x2 312	1	R W	ArcFactory PerCCycle	uint 16	1	1	0	0	100	actu a l valu e	ArcFactoryPerC Cycle
0x2 313	0x2 313	1	R W	ArcFactory Cycle	uint 16	1	1	0	0	100	actu a l valu e	ArcFactoryCycle

#### Group 4 LVRT/HVRT

0x2 400	0x2 400	1	R W	LVRTVoltP ara1	uint 16	0.01 %	%	-2	0	10000	actu a l valu e	LVRTVoltPara1
0x2 401	0x2 401	1	R W	LVRTTime Para1	uint 16	0.01s	S	-2	0	65500	actu a l valu e	LVRTTimePara1
0x2 402	0x2 402	1	R W	LVRTVoltP ara2	uint 16	0.01 %	%	-2	0	10000	actu a l valu e	LVRTVoltPara2
0x2 403	0x2 403	1	R W	LVRTTime Para2	uint 16	0.01s	S	-2	0	65500	actu a l valu e	LVRTTimePara2
0x2 404	0x2 404	1	R W	LVRTVoltP ara3	uint 16	0.01 %	%	-2	0	10000	actu a l valu e	LVRTVoltPara3
0x2 405	0x2 405	1	R W	LVRTTime Para3	uint 16	0.01s	S	-2	0	65500	actu a l valu e	LVRTTimePara3
0x2 406	0x2 406	1	R W	LVRTVoltP ara4	uint 16	0.01 %	%	-2	0	10000	actu a l valu e	LVRTVoltPara4

0x2 407	0x2 407	1	R W	LVRTTime Para4	uint 16	0.01s	S	-2	0	65500	actu a l valu e	LVRTTimePara4
0x2 408	0x2 408	1	R W	LVRTVoltP ara5	uint 16	0.01 %	%	-2	0	10000	actu a l valu e	LVRTVoltPara5
0x2 409	0x2 409	1	R W	LVRTTime Para5	uint 16	0.01s	S	-2	0	65500	actu a l valu e	LVRTTimePara5
0x2 40A	0x2 40A	1	R W	LVRTVoltP ara6	uint 16	0.01 %	%	-2	0	10000	actu a l valu e	LVRTVoltPara6
0x2 40B	0x2 40B	1	R W	LVRTTime Para6	uint 16	0.01s	S	-2	0	65500	actu a l valu e	LVRTTimePara6
0x2 40C	0x2 40C	1	R W	LVRTVoltP ara7	uint 16	0.01 %	%	-2	0	10000	actu a l valu e	LVRTVoltPara7
0x2 40D	0x2 40D	1	R W	LVRTTime Para7	uint 16	0.01s	S	-2	0	65500	actu a l valu e	LVRTTimePara7
0x2 40E	0x2 40E	1	R W	LVRTVoltP ara8	uint 16	0.01 %	%	-2	0	10000	actu a l valu e	LVRTVoltPara8
0x2 40F	0x2 40F	1	R W	LVRTTime Para8	uint 16	0.01s	S	-2	0	65500	actu a l valu e	LVRTTimePara8
0x2 410	0x2 410	1	R W	HVRTVoltP ara1	uint 16	0.01 %	%	-2	1000 0	13500	actu a l valu e	HVRTVoltPara1
0x2 411	0x2 411	1	R W	HVRTTime Para1	uint 16	0.01s	S	-2	0	65500	actu a l valu e	HVRTTimePara1
0x2 412	0x2 412	1	R W	HVRTVoltP ara2	uint 16	0.01 %	%	-2	1000 0	13500	actu a l valu e	HVRTVoltPara2
0x2 413	0x2 413	1	R W	HVRTTime Para2	uint 16	0.01s	S	-2	0	65500	actu a l valu e	HVRTTimePara2

0x2 414	0x2 414	1	R W	HVRTVoltP ara3	uint 16	0.01 %	%	-2	1000 0	13500	actu a l valu e	HVRTVoltPara3
0x2 415	0x2 415	1	R W	HVRTTime Para3	uint 16	0.01s	S	-2	0	65500	actu a l valu e	HVRTTimePara3
0x2 416	0x2 416	1	R W	HVRTVoltP ara4	uint 16	0.01 %	%	-2	1000 0	13500	actu a l valu e	HVRTVoltPara4
0x2 417	0x2 417	1	R W	HVRTTime Para4	uint 16	0.01s	S	-2	0	65500	actu a l valu e	HVRTTimePara4
0x2 418	0x2 418	1	R W	HVRTVoltP ara5	uint 16	0.01 %	%	-2	1000 0	13500	actu a l valu e	HVRTVoltPara5
0x2 419	0x2 419	1	R W	HVRTTime Para5	uint 16	0.01s	S	-2	0	65500	actu a l valu e	HVRTTimePara5
0x2 41A	0x2 41A	1	R W	HVRTVoltP ara6	uint 16	0.01 %	%	-2	1000 0	13500	actu a l valu e	HVRTVoltPara6
0x2 41B	0x2 41B	1	R W	HVRTTime Para6	uint 16	0.01s	S	-2	0	65500	actu a l valu e	HVRTTimePara6
0x2 41C	0x2 41C	1	R W	HVRTVoltP ara7	uint 16	0.01 %	%	-2	1000 0	13500	actu a l valu e	HVRTVoltPara7
0x2 41D	0x2 41D	1	R W	HVRTTime Para7	uint 16	0.01s	S	-2	0	65500	actu a l valu e	HVRTTimePara7
0x2 41E	0x2 41E	1	R W	HVRTVoltP ara8	uint 16	0.01 %	%	-2	1000 0	13500	actu a l valu e	HVRTVoltPara8
0x2 41F	0x2 41F	1	R W	HVRTTime Para8	uint 16	0.01s	S	-2	0	65500	actu a l valu e	HVRTTimePara8
<b>Group 5 Others Parameters</b>												
0x2 500	0x2 500	1	R W	StartDelay	uint 16	1s	s	0	1	1200	actu a l valu e	Startup delay time

0x2501	0x2501	1	RW	PVStartVol	uint16	1V	V	0	300	400	actual value	PV start-up voltage
0x2502	0x2502	1	RW	PVPowerMutateRatio (HECO)	uint16	0.01%	%	-2	1	10000	actual value	The output power should be slow increased due to the change of PV illumination at the Rule 21 standard.
0x2503	0x2503	1	RW	GridFaultPS taStep	uint16	0.01%	%	-2	1	10000	actual value	Power startup step after Grid Fault
0x2504	0x2504	1	RW	StopPowerStep	uint16	0.01%	%	-2	1	10000	actual value	Normal power step in soft stop
0x2505	0x2505	1	RW	PsoftStaStep	uint16	0.01%	%	-2	1	10000	actual value	Normal power step in soft startup
0x2506	0x2506	1	RW	PDeratingStep	uint16	0.01%	%	-2	1	10000	actual value	Normal power derating step
0x2507	0x2507	1	RW	StartUpTemp	uint16	0.1°C	°C	0	-400	1000	actual value	The minimum startup temperature
0x2508	0x2508	1	RW	FaultPowerTemp	uint16	0.1°C	°C	0	0	1000	actual value	The trigger temperature of module
0x2509	0x2509	1	RW	FaultEnvTemp	uint16	0.1°C	°C	0	0	1000	actual value	The trigger temperature of enviroment
0x250A	0x250A	1	RW	HVRTTripVol	uint16	0.1%	%	-1	1000	1350	actual value	The trigger voltage of HVRT
0x250B	0x250B	1	RW	LVRTTripVol	uint16	0.1%	%	-1	700	1000	actual value	The trigger voltage of LVRT
0x250C	0x250C	1	RW	LVRTPosCurrK	uint16	0.1%	%	-1	0	3000	actual value	The coefficient of positive sequence reactive current

0x250D	0x250D	1	RW	LVRTNegCurrK	uint16	0.1%	%	-1	0	3000	actual value	The coefficient of negative sequence reactive current
0x250E	0x250E	1	RW	PSet_Percent	uint16	0.1%	%	-1	0	1000	actual value	Remote electric dispatch Active Power setting value
0x250F	0x250F	1	RW	QSet_Percent	uint16	0.1%	%	-1	-600	600	actual value	Remote electric dispatch Reactive Power setting value
0x2510	0x2510	1	RW	Risomin	uint16	1KΩ	KΩ	0	1	2000	actual value	Minimum insulation resistance
0x2511	0x2511	1	RW	GFCIStaProValue	uint16	1mA	mA	0	100	1000	actual value	The threshold value of Leakage current
0x2512	0x2512	1	RW	GFCIStaProTime	uint16	0.01s	s	-2	0	65500	actual value	The upper limit of Leakage current
0x2513	0x2513	1	RW	GFCIDynaProCoef	uint16	0.1%	%	-1	0	2000	actual value	The upper limit of Leakage current
0x2514	0x2514	1	RW	DCIMax	uint16	0.01%	%	-2	100	500	actual value	maximun DCI value1
0x2515	0x2515	1	RW	DCIMax1Time	uint16	0.01s	s	-2	0	12000	actual value	Trip time 1 of DCI value
0x2516	0x2516	1	RW	DCIMax2	uint16	1mA	A	-3	5	5000	actual value	maximun DCI value2
0x2517	0x2517	1	RW	DCIMax2Time	uint16	0.01s	s	-2	0	12000	actual value	Trip time 2 of DCI value
0x2518	0x2518	1	RW	KprForRepeat	uint16	1%	%	0	0	100	actual value	Parameter of repetitive control
0x2519	0x2519	1	RW	MPPTTime	uint16	10s	s	1	30	540	actual value	MPPTScan Cycle



0x251A	0x051A	1	RW	ChecksumGroup1_6	Hex	N/A	N/A	N/A	N/A	N/A	actual value	CeckSum from group 1 to group 6 in EEPROM
<b>Group 6 Enable/disable control Parameters</b>												
0x2600	0x2600	1	RW	CtrlParaGroup	uint16	N/A	N/A	1	0	4	actual value	The enabled control parameters group.
0x2601	0x2601	1	RW	ReactivePwModeSelect	uint16	N/A	N/A	1	0	5	actual value	The control mode of reactive power 0: Disable dispatch mode. 1: Remote dispatch mode. 2: Local control ,by Q 3: Local control ,by PF 4: PF(P)curve 5: Q(U) curve
0x2602	0x2602	1	RW	ActivePwModeSelect	uint16	N/A	N/A	1	0	2	actual value	The control mode of active power 0: Disable dispatch mode. 1: Remote dispatch mode. 2: Local control.
0x2603	0x2603	1	RW	MPPTScanEn	uint16	N/A	N/A	1	0	1	actual value	MPPT scan enable/disable control 0: Disable 1: Enable
0x2604	0x2604	1	RW	ArcEn	uint16	N/A	N/A	1	0	1	actual value	Arc detection enable/disable control 0: Disable 1: Enable
0x2605	0x2605	1	RW	ArcParaGroup	uint16	N/A	N/A	1	0	3	actual value	Set parameters group of arc detection
0x2606	0x2606	1	RW	VpvStartUpSetEn	uint16	N/A	N/A	1	0	1	actual value	PV voltage at start up adjusting enable/disable control 0: Disable 1: Enable
0x2607	0x2607	1	RW	IslandEn	uint16	N/A	N/A	1	0	1	actual value	Island enable/disable control 0: Disable 1: Enable

0x2 608	0x2 608	1	R W	LvrtMode	uint 16	N/A	N / A	1	0	2	actu a l valu e	0: Disable 1: Enable, no reactive power output 2: Enable, reactive power output
0x2 609	0x2 609	1	R W	HvrtMode	uint 16	N/A	N / A	1	0	2	actu a l valu e	0: Disable 1: Enable, no reactive power output 2: Enable, reactive power output
0x2 60A	0x2 60A	1	R W	SoftStopEn	uint 16	N/A	N / A	1	0	1	actu a l valu e	soft stop enable/ disable control
0x2 60B	0x2 60B	1	R W	PIDCheckEn	uint 16	N/A	N / A	1	0	3	actu a l valu e	PID Checking enable/disable control
0x2 60C	0x2 60C	1	R W	GridOV1Pr oEn	uint 16	N/A	N / A	1	0	1	actu a l valu e	Over grid voltage triggering enable/ disable control 0: Disable 1: Enable
0x2 60D	0x2 60D	1	R W	GridOV2Pr oEn	uint 16	N/A	N / A	1	0	1	actu a l valu e	Over grid voltage triggering enable/ disable control 0: Disable 1: Enable
0x2 60E	0x2 60E	1	R W	GridOV3Pr oEn	uint 16	N/A	N / A	1	0	1	actu a l valu e	Over grid voltage triggering enable/ disable control 0: Disable 1: Enable
0x2 60F	0x2 60F	1	R W	GridUV1Pr oEn	uint 16	N/A	N / A	1	0	1	actu a l valu e	Under grid voltage triggering enable/disable control 0: Disable 1: Enable
0x2 610	0x2 610	1	R W	GridUV2Pr oEn	uint 16	N/A	N / A	1	0	1	actu a l valu e	Under grid voltage triggering enable/disable control 0: Disable 1: Enable
0x2 611	0x2 611	1	R W	GridUV3Pr oEn	uint 16	N/A	N / A	1	0	1	actu a l valu e	Under grid voltage triggering enable/disable control 0: Disable 1: Enable
0x2 612	0x2 612	1	R W	GridOF1Pro En	uint 16	N/A	N / A	1	0	1	actu a l valu e	Over grid frequency triggering enable/ disable control 0: Disable 1: Enable

0x2613	0x2613	1	RW	GridOF2ProEn	uint16	N/A	N/A	1	0	1	actual value	Over grid frequency triggering enable/disable control 0: Disable 1: Enable
0x2614	0x2614	1	RW	GridOF3ProEn	uint16	N/A	N/A	1	0	1	actual value	Over grid frequency triggering enable/disable control 0: Disable 1: Enable
0x2615	0x2615	1	RW	GridUF1ProEn	uint16	N/A	N/A	1	0	1	actual value	Under grid frequency triggering enable/disable control 0: Disable 1: Enable
0x2616	0x2616	1	RW	GridUF2ProEn	uint16	N/A	N/A	1	0	1	actual value	Under grid frequency triggering enable/disable control 0: Disable 1: Enable
0x2617	0x2617	1	RW	GridUF3ProEn	uint16	N/A	N/A	1	0	1	actual value	Under grid frequency triggering enable/disable control 0: Disable 1: Enable
0x2618	0x2618	1	RW	VMaxMovAvgEn	uint16	N/A	N/A	1	0	1	actual value	Enable/disable control of limiting the upper of moving average filter 0: Disable 1: Enable
0x2619	0x2619	1	RW	VMinMovAvgEn	uint16	N/A	N/A	1	0	1	actual value	Enable/disable control of limiting the lower of moving average filter 0: Disable 1: Enable
0x261A	0x261A	1	RW	GFCIStaEn	uint16	N/A	N/A	1	0	1	actual value	GFCI static detection enable/disable control 0: Disable 1: Enable
0x261B	0x261B	1	RW	GFCIDynEn	uint16	N/A	N/A	1	0	1	actual value	GFCI dynamic detection enable/disable control

0x261C	0x261C	1	RW	OFDerEn	uint16	N/A	N/A	1	0	4	actual value	Over frequency derating enable/disable control 0: Disable 1: Enable
0x261D	0x261D	1	RW	DCIMax1En	uint16	N/A	N/A	1	0	1	actual value	DCI protection1 enable/disable control 0: Disable 1: Enable
0x261E	0x261E	1	RW	DCIMax2En	uint16	N/A	N/A	1	0	1	actual value	DCI protection2 enable/disable control 0: Disable 1: Enable
0x261F	0x261F	1	RW	VgridUnbalanceEn	uint16	N/A	N/A	1	0	1	actual value	Unbalance rate of grid voltage detection enable/disable control 0: Disable 1: Enable
0x2620	0x2620	1	RW	UFDerEn	uint16	N/A	N/A	1	0	1	actual value	Under frequency derating enable/disable control 0: Disable 1: Enable
0x2621	0x2621	1	RW	VgridDerEn	uint16	N/A	N/A	1	0	1	actual value	Grid voltage derating enable/disable control 0: Disable 1: Enable
0x2622	0x2622	1	RW	PowerMutateRatio (HECO)	uint16	N/A	N/A	1	0	1	actual value	soft startup function after power saltation 0: Disable 1: Enable
0x2623	0x2623	1	RW	ISOEn	uint16	N/A	N/A	1	0	1	actual value	ISO detection enable/disable control 0: Disable 1: Enable
0x2624	0x2624	1	RW	FanDetectEn	uint16	N/A	N/A	1	0	1	actual value	Fan detection enable/disable control 0: Disable 1: Enable
<b>Group 7 Control Command</b>												
0x2700	0x2700	1	RW	CMD_PowerOnOff	uint16	N/A	N/A	N/A	N/A	N/A	actual value	Power on or power off device command, 0x5555 power on, 0x7777 power off

0x2 701	0x2 701	1	R W	CMD_ForceRestart	uint 16	N/A	N/A	N/A	N/A	N/A	actual value	Device force restart command, valid value is 0x5AAA
0x2 702	0x2 702	1	R W	CMD_FactoryReset	uint 16	N/A	N/A	N/A	N/A	N/A	actual value	Device factory reset command, valid value is 0x5AAA
0x2 703	0x2 703	1	R W	CMD_AutoTest	uint 16	N/A	N/A	N/A	N/A	N/A	actual value	Device auto test command, valid value is 0x5AAA
0x2 704	0x2 704	1	R W	CMD_MPP TScan	uint 16	N/A	N/A	N/A	N/A	N/A	actual value	M P P T s c a n command, valid value is 0x5AAA
0x2 705	0x2 705	1	R W	CMD_ArcDetect	uint 16	N/A	N/A	N/A	N/A	N/A	actual value	Arc Detection command, valid value is 0x5AAA
0x2 706	0x2 706	1	R W	CMD_ArcAlarmClear	uint 16	N/A	N/A	N/A	N/A	N/A	actual value	Clear Arc alarm, valid value is 0x5AAA
0x2 707	0x2 707	1	R W	PF_Remote	uint 16	0.001	N/A	N/A	-1000 ~ -800	800 ~ 1000		Remote electric dispatch Power Factor setting value
0x2 708	0x2 708	1	R W	P_Remote	uint 16	0.1%	N/A	N/A	0	1000		Remote electric dispatch Active Power setting value
0x2 709	0x2 709	1	R W	Q_Remote	uint 16	0.1%	N/A	N/A	-600	600		Remote electric dispatch Reactive Power setting value

### Group 9 Inverter Basic Information

0x2 900	0x2 900	1	R O	MachineVersion	B C D	N/A	N/A	N/A	N/A	N/A	actual value	Machine Version
0x2 901	0x2 901	1	R O	D S P F W Version	B C D	N/A	N/A	N/A	N/A	N/A	actual value	DSP Firmware Version
0x2 902	0x2 902	1	R O	D S P F W ChkSum	H e x	N/A	N/A	N/A	N/A	N/A	actual value	DSP Firmware Code CheckSum
0x2 903	0x2 903	1	R O	BootFWVersion	B C D	N/A	N/A	N/A	N/A	N/A	actual value	Boot Loader Firmware Version

0x2904	0x2904	1	R O	BootFWCodeChecksum	Hex	N/A	N/A	N/A	N/A	N/A	actual value	Boot Loader Firmware Code CheckSum
0x2905	0x2905	1	R O	CPLDVersion	BCD	N/A	N/A	N/A	N/A	N/A	actual value	CPLD Version
0x2906	0x2906	1	R W	SN20~17	BCD	N/A	N/A	N/A	N/A	N/A	actual value	Serial number , as BCD code
0x2907	0x2907	1	R W	SN16~13	BCD	N/A	N/A	N/A	N/A	N/A	actual value	
0x2908	0x2908	1	R W	SN12~9	BCD	N/A	N/A	N/A	N/A	N/A	actual value	
0x2909	0x2909	1	R W	SN8~5	BCD	N/A	N/A	N/A	N/A	N/A	actual value	
0x290A	0x290A	1	R W	SN4~1	BCD	N/A	N/A	N/A	N/A	N/A	actual value	
0x290B	0x290B	1	R O	ProductCode	BCD	N/A	N/A	N/A	N/A	N/A	actual value	
0x290C	0x290C	1	R W	GridStandard	Hex	N/A	N/A	N/A	N/A	N/A	actual value	Standard setting , see Table7
0x290D	0x290D	1	R W	NeutralLine	Hex	N/A	N/A	N/A	N/A	N/A	actual value	Neutral Line 0x5A5A : connected to N line 0xA5A5 : not connected to N line
0x290E	0x290E	1	R W	PVLinkStatus	Hex	N/A	N/A	N/A	N/A	N/A	actual value	PV Link Status 0x5A5A : independent connection 0xA5A5: parallel connection
0x290F	0x290F	1	R O	DSP Safety Firmware Code CheckSum	Hex	N/A	N/A	N/A	N/A	N/A	actual value	N/A

0x2910	0x2910	1	RO	miniMCU Firmware Version	BCD	N/A	N/A	N/A	N/A	N/A	actual value	N/A
0x2911	0x2911	1	RO	This field CheckSum	Hex	N/A	N/A	N/A	N/A	N/A	actual value	N/A

## 5 Inverter Work Mode Descriptor

**Table 5-1 Inverter Work Mode**

Start	End	Size	R/W	Name	Type	Units	Contents	Description
0x002F	0x002F	1	R	Mode	uint16	1	0x8000/ 0x4000/ 0x2000/ 0x1000/ 0x0800/	0x8000: Fault 0x4000: Check 0x2000: Standby 0x1000: Running 0x0800: Derate

## 6 Standard Descriptor

**Table 6-1 CPS 60KW Standard Descriptor**

Standard Value	Corresponding laws and regulations
0	NONE
10	IEEE1547
19	Rule-21
20	HECO-HM
21	HECO-ML

## 7 Input Registers Data Mapping

As with the holding register, according to the data type, the input register allocation into a plurality of blocks, each block of the address range, the following table "input register block address allocation table is shown; parameter definition and address allocation within each block, the following table input register allocation table shown. Read using 0x04 function code.

**Table 7-1 Input register block address allocation table**

Address range	Data type
0x8000 ~ 0x80FF	Grid status information
0x8100 ~ 0x81FF	Inverter output status information data area
0x8200 ~ 0x82FF	Inverter (PV) input status information data area
0x8300 ~ 0x83FF	Inverter internal state information data area
0x8400 ~ 0x84FF	Inverter fault status information data area

Note: address 0x9000 later for SunSpec, therefore, in this protocol, do not use.

**Table7-2 Grid status information**

Register address (1Word)	Data variable description (Chinese / English)	Unit / Storage format	Read and write rules	Explain (1Word)
<b>Grid status information</b>				
0x8000	Line voltage Uab / Uab	0.1 V / Hex	Read	N/A



0x8001	Line voltage Ubc / Ubc	0.1 V / Hex	Read	N/A
0x8002	Line voltage Uca / Uca	0.1 V / Hex	Read	N/A
0x8003	A Phase voltage Ua / Ua	0.1 V / Hex	Read	N/A
0x8004	B Phase voltage Ub / Ub	0.1 V / Hex	Read	N/A
0x8005	C Phase voltage Uc / Uc	0.1 V / Hex	Read	N/A
0x8006	A phase power grid frequency / FreqGridR	0.1Hz / Hex	Read	N/A
0x8007	B phase power grid frequency / FreqGridS	0.1Hz / Hex	Read	N/A
0x8008	C phase power grid frequency / FreqGridT	0.1Hz / Hex	Read	N/A
0x8009	Grid phase sequence / PhaseSequence	0: NA, 1 : Positive, 2 : negative	Read	N/A
0x800A	Voltage unbalance degree of power network / GridVolUnbalanceDegree	0.1% / Hex	Read	N/A
0x800B	Frequency of power grid system	0.1Hz / Hex	Read	N/A
0x800C	Voltage between N line and PE in power grid	1V / Hex	Read	NPEVolt
0x800D	MiniMCU detected power grid R phase current	1A / Hex	Read	N/A
0x800E	MiniMCU detected power grid S phase current	1A / Hex	Read	N/A
0x800F	MiniMCU detected power grid T phase current	1A / Hex	Read	N/A
0x8010	MiniMCU detection power grid R phase voltage	1V/ Hex	Read	N/A
0x8011	MiniMCU detection power grid S phase voltage	1V/ Hex	Read	N/A
0x8012	MiniMCU detection power grid T phase voltage	1V/ Hex	Read	N/A
<b>Inverter output status information data area</b>				
0x8100	A phase current / Ia	0.1A / Hex	Read	N/A
0x8101	B phase current / Ic	0.1A / Hex	Read	N/A
0x8102	C phase current / Ic	0.1A / Hex	Read	N/A

0x8103	A phase active power	0.1KW / Hex	Read	N/A
0x8104	B phase active power	0.1KW / Hex	Read	N/A
0x8105	C phase active power	0.1KW / Hex	Read	N/A
0x8106	3 phase total active power	0.1KW / Hex	Read	N/A
0x8107	A phase Reactive power	0.1KVar / Hex	Read	N/A
0x8108	B phase Reactive power	0.1KVar / Hex	Read	N/A
0x8109	C phase Reactive power	0.1KVar / Hex	Read	N/A
0x810A	3 phase Total reactive power	0.1KVar / Hex	Read	N/A
0x810B	A phase power factor	0.01 / Hex	Read	N/A
0x810C	B phase power factor	0.01 / Hex	Read	N/A
0x810D	C phase power factor	0.01 / Hex	Read	N/A
0x810E	Three phase power factor	0.1V / Hex	Read	N/A
0x810F	Inverter A phase voltage	0.1V / Hex	Read	N/A
0x8110	Inverter B phase voltage	0.1V / Hex	Read	N/A
0x8111	Inverter C phase voltage	0.1V / Hex	Read	N/A
<b>Inverter (PV) input status information data area</b>				
0x8200	PV connection mode / Pv Link Type	0 : Not detected 1 : Parallel connectio n 2 : Independe nt	Read	N/A
0x8201	Total input power of DC / Pdc	0.1KW / Hex	Read	N/A
0x8202	PV voltage 1 / Upv1	0.1V / Hex	Read	N/A
0x8203	PV current 1 / Ipv1	0.1A / Hex	Read	N/A
0x8204	PV voltage 2 / Upv2	0.1V / Hex	Read	N/A

0x8205	PV current 2 / Ipv2	0.1A / Hex	Read	N/A
0x8206	PV voltage 3 / Upv3	0.1V / Hex	Read	N/A
0x8207	PV current 3 / Ipv3	0.1A / Hex	Read	N/A
0x8208	Boost1 Current	0.1A / Hex	Read	N/A
0x8209	Boost2 Current	0.1A / Hex	Read	N/A
0x820A	Boost3 Current	0.1A / Hex	Read	N/A
0x820B	Boost4 Current	0.1A / Hex	Read	N/A
0x820C	Boost5 Current	0.1A / Hex	Read	N/A
0x820D	Boost6 Current	0.1A / Hex	Read	N/A
<b>Inverter internal state information data area</b>				
0x8300	Inverter operation mode / Opreation Status	Hex	Read	Refer to the following table7-3
0x8301	LCD switch command execution state feedback	Hex	Read	If the LCD does not send the switch command, then reply to 0xFFFF
0x8302	Module temperature	0.1°C / Hex	Read	N/A
0x8303	Internal temperature	0.1°C / Hex	Read	N/A
0x8304	Insulation impedance detection (ISO)	1KΩ / Hex	Read	N/A
0x8305	Leakage current detection value (GFCI)	1mA / Hex	Read	N/A
0x8306	A phase direct current component (DCI)	1mA / Hex	Read	N/A
0x8307	B phase direct current component (DCI)	1mA / Hex	Read	N/A
0x8308	C phase direct current component (DCI)	1mA / Hex	Read	N/A
0x8309	Positive Bus voltage	1V / Hex	Read	N/A
0x830A	Negative Bus voltage	1V / Hex	Read	N/A
0x830B	Positive and negative Bus voltage	1V / Hex	Read	N/A
0x830C	Starting the countdown	1s / Hex	Read	N/A

0x830D	ISO sampling circuit detection voltage	1V / Hex	Read	N/A
<b>Inverter fault status information data area</b>				
0x8400	Internal warning failure / Warn	Hex	Read	Bit resolution, see table8-1 or table8-2
0x8401	Internal recoverable failure 1 / Fault 0			
0x8402	Internal recoverable failure 2 / Fault 1			
0x8403	Internal recoverable failure 3 / Fault 2			
0x8404	Internal recoverable failure 4 / Fault 3			
0x8405	Internal recoverable failure 5 / Fault 4			
0x8406	Internal permanent fault			

**Table7-3 Inverter operation mode bit**

0x8300	Statu s	Bit15	Fault	Fault
		Bit14	Sys.Checking(PreCheck)	Sys.Checking
		Bit13	Standby(Power On)	Standby
		Bit12	Running(Inv Run)	Running
		Bit11	BreakState2	Note (1)
		Bit10	BreakState1	
		Bit9	BreakState0	
		Bit8	N/A	N/A
		Bit7	PV Start Power Checking	1: Running, 0: No
		Bit6	PV Low Can't Start	1: Fail, 0: OK
		Bit5	PV High Can't Start	1: Fail, 0: OK
		Bit4	Temp Low Can't Start	1: Fail, 0: OK
		Bit3	PowerDown	Bti3-Bit0 Use only 4 working status lights (LED) on the LCD display panel
		Bit2	GridOk	
		Bit1	Inverter Running	
Bit0	Poweron			

## 8 Inverter Fault Code Descriptor

When one bit is set to "1", it indicates that the representative of the fault is occurring, and if the bit is set to "0", it indicates that the representative of the fault has not occurred.

## 8.1 Fault Code

**Table8-1 For DSP Software Version 1.00**

Register address	Storing data	Fault analysis	LCD English display	
0x8400	Warn	Bit15	Reserved	Warn0150
		Bit14	Reserved	Warn0140
		Bit13	Reserved	Warn0130
		Bit12	Reserved	Warn0120
		Bit11	Reserved	Warn0110
		Bit10	Reserved	Warn0100
		Bit9	Compatible	Warn0090
		Bit8	Compatible	Warn0080
		Bit7	AC side MOV anomaly	Warn0070
		Bit6	Compatible	Warn0060
		Bit5	Temperature sensor anomaly	Warn0050
		Bit4	DC side lightning protection exception	Warn0040
		Bit3	EEPROM fault	Warn0030
		Bit2	Reserved	CommErr
		Bit1	Internal fan alarm	IntFanErr
Bit0	External fan alarm	ExtFanErr		
0x8401	Fault 0	Bit15	Inverter current bias	Protect0010
		Bit14	Over temperature protection	TempOver
		Bit13	Grid connected relay protection	Protect0020
		Bit12	Out of phase	GridV.OutLim
		Bit11	Low frequency of power grid	GridF.OutLim
		Bit10	High frequency of power grid	GridF.OutLim
		Bit9	Inverter current too high	Protect0030
		Bit8	Grid phase voltage over limit	GridV.OutLim
		Bit7	Grid line voltage over limit	GridV.OutLim
		Bit6	PV1 High current	Protect0040
		Bit5	Compatible	N/A
		Bit4	Inverter Soft start time out	Protect0050
		Bit3	Bus Soft start time out	Protect0060
		Bit2	BUS difference is high	Protect0070
		Bit1	Compatible	Protect0080
Bit0	BUS sum high	Protect0090		

0x8402	Fault 1	Bit15	Leakage current sensor fault	Protect0100
		Bit14	Bus hardware over voltage	Protect0110
		Bit13	Compatible	N/A
		Bit12	Power module protection	Protect0120
		Bit11	Inverter current imbalance	Protect0130
		Bit10	Compatible	N/A
		Bit9	Unbalanced grid voltage	GridV.OutLim
		Bit8	inverter hardware over current	Protect0140
		Bit7	MCU Protect	Protect0150
		Bit6	Compatible	N/A
		Bit5	Frequency selective anomaly	Protect0160
		Bit4	Leakage current is too high	GFCIErr
		Bit3	Insulation impedance is too low	IsolationErr
		Bit2	DCI High current	Protect0170
		Bit1	DCI current bias	Protect0180
		Bit0	Reserved	Protect0190
0x8403	Fault 2	Bit15	Reserved	N/A
		Bit14	Reserved	Protect0290
		Bit13	Reserved	Protect0300
		Bit12	PV3 voltage is too high	PV3VoltOver
		Bit11	PV3 input reverse connection	PV3Reverse
		Bit10	PV1 voltage is too high	PV1VoltOver
		Bit9	PV1 input reverse connection	PV1Reverse
		Bit8	Compatible	N/A
		Bit7	Turn on the inverter Open loop detection	Protect0230
		Bit6	anomal PV source input	Protect0260
		Bit5	PV2 voltage is too high	PV2VoltOver
		Bit4	PV2 input over current	Protect0240
		Bit3	PV2 reverse connection	PV2Reverse
		Bit2	Input / output power mismatch	Protect0220
		Bit1	Internal hardware exception	Protect0210
		Bit0	Reserved	Protect0200
		Bit15	ARC protection	ARC Protect
		Bit14	Reserved	Protect0320
		Bit13	Reserved	Protect0330
		Bit12	Reserved	Protect0340

0x8404	Fault 3	Bit11	Reserved	Protect0350
		Bit10	Reserved	Protect0360
		Bit9	Reserved	Protect0370
		Bit8	Reserved	Protect0380
		Bit7	Reserved	Protect0390
		Bit6	Reserved	Protect0400
		Bit5	CPLD software version exception	Protect0410
		Bit4	Anomal product model	Protect0420
		Bit3	Anomal Source for drive hardware	Protect0430
		Bit2	Compatible	Protect0440
		Bit1	Bst Hardware overcurrent	Protect0450
		Bit0	Control board 3.3V voltage low	Protect0460
0x8405	Fault 4	Bit15	Reserved	Protect0470
		Bit14	Reserved	Protect0480
		Bit13	Reserved	Protect0490
		Bit12	Reserved	Protect0500
		Bit11	Reserved	Protect0510
		Bit10	Reserved	Protect0520
		Bit9	Reserved	Protect0530
		Bit8	Reserved	Protect0540
		Bit7	Reserved	Protect0550
		Bit6	Reserved	Protect0560
		Bit5	Capture phase locked loop check exception	Protect0570
		Bit4	PV3 input over current	Protect0580
		Bit3	Reserved	Protect0590
		Bit2	Arc board fault	Arcboard Err
		Bit1	Steady state GFCI protection	Protect0610
		Bit0	Control board 5V voltage low	Protect0620
		Bit15	Control board voltage and drive power failure	Fault0160
		Bit14	Open loop self detection failure	Fault0150
		Bit13	Internal hardware failure	Fault0140
		Bit12	Permanent fault of power module	Fault0010
		Bit11	Reserved	Fault0020

0x8406	PFault	Bit10	Reserved	Fault0030
		Bit9	Permanent fault of driver source	Fault0040
		Bit8	Inverter hardware overcurrent fault	Fault0050
		Bit7	Bus hardware overvoltage fault	Fault0060
		Bit6	DCI too high fault	Fault0070
		Bit5	Bst hardware overcurrent fault	Fault0080
		Bit4	Steady state GFCI fault	Fault0090
		Bit3	Relay fault	Fault0100
		Bit2	Bus differential high fault	Fault0110
		Bit1	Permanent fault of 3.3V voltage low	Fault0120
		Bit0	Bus sum high fault	Fault0130

**Table8-2 For DSP Software Version 2.00 or Newer Version**

Register address	Storing data	Fault analysis	LCD English display	
0x8400	Warn	Bit15	Reserved	Warn0150
		Bit14	Reserved	Warn0140
		Bit13	Reserved	Warn0130
		Bit12	Reserved	Warn0120
		Bit11	Reserved	Warn0110
		Bit10	AC side MOV anomaly	Warn0100
		Bit9	Compatible	Warn0090
		Bit8	Compatible	Warn0080
		Bit7	Compatible	Warn0070
		Bit6	Compatible	Warn0060
		Bit5	Temperature sensor anomaly	Warn0050
		Bit4	DC side lightning protection exception	Warn0040
		Bit3	EEPROM fault	Warn0030
		Bit2	Reserved	CommErr
		Bit1	Internal fan alarm	IntFanErr
		Bit0	External fan alarm	ExtFanErr
		Bit15	Inverter current bias	Protect0010
		Bit14	Over temperature protection	TempOver
		Bit13	Grid connected relay protection	Protect0020



0x8401	Fault 0	Bit12	Out of phase	GridV.OutLim
		Bit11	Low frequency of power grid	GridF.OutLim
		Bit10	High frequency of power grid	GridF.OutLim
		Bit9	High inverter current	Protect0030
		Bit8	Grid phase voltage over limit	GridV.OutLim
		Bit7	Grid line voltage over limit	GridV.OutLim
		Bit6	PV1 High current	Protect0040
		Bit5	Compatible	N/A
		Bit4	Inverter Soft start time out	Protect0050
		Bit3	Bus Soft start time out	Protect0060
		Bit2	BUS difference is high	Protect0070
		Bit1	Compatible	Protect0080
		Bit0	BUS sum high	Protect0090
0x8402	Fault 1	Bit15	Leakage current sensor fault	Protect0100
		Bit14	Bus hardware over voltage	Protect0110
		Bit13	Compatible	N/A
		Bit12	Power module protection	Protect0120
		Bit11	Inverter current imbalance	Protect0130
		Bit10	Compatible	N/A
		Bit9	Unbalanced grid voltage	GridV.OutLim
		Bit8	inverter hardware over current	Protect0140
		Bit7	MCU Protect	Protect0150
		Bit6	Compatible	N/A
		Bit5	Frequency selective anomaly	Protect0160
		Bit4	Leakage current is too high	GFCIErr
		Bit3	Insulation impedance is too low	IsolationErr
		Bit2	DCI High current	Protect0170
		Bit1	DCI current bias	Protect0180
Bit0	Compatible	Protect0190		
	Fault	Bit15	Compatible	N/A
		Bit14	Compatible	Protect0290
		Bit13	Compatible	Protect0300
		Bit12	PV3 voltage is too high	PV3VoltOver
		Bit11	PV3 input reverse connection	PV3Reverse
		Bit10	PV1 voltage is too high	PV1VoltOver
		Bit9	PV1 input reverse connection	PV1Reverse
		Bit8	Compatible	N/A

0x8403	Fault 2	Bit7	Turn on the inverter Open loop detection	Protect0230
		Bit6	Compatible	Protect0260
		Bit5	PV2 voltage is too high	PV2VoltOver
		Bit4	PV2 input over current	Protect0240
		Bit3	PV2 reverse connection	PV2Reverse
		Bit2	Compatible	Protect0220
		Bit1	Internal hardware exception	Protect0210
		Bit0	Compatible	Protect0200
0x8404	Fault 3	Bit15	ARC protection	ARC Protect
		Bit14	Compatible	Protect0320
		Bit13	Hardware driver power exception	Protect0330
		Bit12	Compatible	Protect0340
		Bit11	Compatible	Protect0350
		Bit10	Compatible	Protect0360
		Bit9	Compatible	Protect0370
		Bit8	Compatible	Protect0380
		Bit7	Compatible	Protect0390
		Bit6	Compatible	Protect0400
		Bit5	Compatible	Protect0410
		Bit4	Compatible	Protect0420
		Bit3	Compatible	Protect0430
		Bit2	Compatible	Protect0440
0x8405	Fault 4	Bit15	Reserved	Protect0470
		Bit14	Reserved	Protect0480
		Bit13	Reserved	Protect0490
		Bit12	Reserved	Protect0500
		Bit11	Reserved	Protect0510
		Bit10	CPLD clock exception	Protect0520
		Bit9	CPLD program version exception	Protect0530
		Bit8	Product model exception	Protect0540
		Bit7	Bst Hardware overcurrent	Protect0550
		Bit6	Control board 3.3V voltage low	Protect0560
		Bit5	Capture phase locked loop check exception	Protect0570

		Bit4	PV3 input over current	Protect0580
		Bit3	Battery plate super match	Protect0590
		Bit2	Arc board fault	Arcboard Err
		Bit1	Steady state GFCI protection	Protect0610
		Bit0	Control board 5V voltage low	Protect0620
0x8406	PFault	Bit15	Control board voltage and drive power failure	Fault0160
		Bit14	Open loop self detection failure	Fault0150
		Bit13	Internal hardware failure	Fault0140
		Bit12	Permanent fault of power module	Fault0010
		Bit11	Bus hardware overvoltage fault	Fault0020
		Bit10	Compatible	Fault0030
		Bit9	Compatible	Fault0040
		Bit8	Inverter hardware overcurrent fault	Fault0050
		Bit7	CPLD clock failure	Fault0060
		Bit6	DCI too high fault	Fault0070
		Bit5	Bst hardware overcurrent fault	Fault0080
		Bit4	Steady state GFCI fault	Fault0090
		Bit3	Relay fault	Fault0100
		Bit2	Bus differential high fault	Fault0110
		Bit1	Compatible	Fault0120
		Bit0	Bus sum high fault	Fault0130