MODBUS RTU 三相储能通信规约

1. 概述

本协议适用于我司三相储能逆变器与上位机监控和 DSP 之间的通信协议。采用 MODBUS RTU 通讯规约。本协议可以实时读取逆变器的运行信息和对逆变器控制操作。

2. 物理接口

2.1. 采用 RS485/RS232，为异步收发方式，主从模式，固定波特率。

----波特率：9600bps
----奇偶校验位：None
----数据位：8
----停止位：1

2.2. 帧间间隔时间要求

3. 数据帧格式

Slave Address	Function code	Data	CRC Check
8-Bits	8-Bits	Nx8-Bits	16-Bits

Slave Address 域：是对应的从机地址，必须和逆变器的从机地址匹配。
Function code 域：功能码，目前只开放 03H、10H 功能码。
Data 域：包括起始寄存器地址，数据长度，数据字节个数，数据内容。都是高字节在前，

Function code(Hex)	中文名	寄存器地址	功能
02H	读开关输入状态		读故障信息寄存器内容
03H	读保持寄存器	0~59/500~2000	读设置寄存器内容
04H	读输入寄存器		读逆变器信息内容
05H	写单个线圈		开关机设置功能
06H	写单个保持寄存器		设置单字节功能
10H	写多个保持寄存器	60-499	设置多字节功能

低字节在后。
CRC Check 域： CRC 查表校验方式，低字节在前高字节在后。

4. 错误信息及数据的处理

从机回复(16 进制)：
逆变器通讯模块检测到除了 CRC 码出错以外的错误时，必须向主机回送信息，功能码的最高位置为 1，即

Slave Address	Function code	Error code	CRC Check	
xx	xx|0x80	xx	低字节	高字节
			xx	xx

在主机发送的功能码的基础上加 128 。

逆变器通讯模块响应回送的错误码：

0x01 非法的功能码 服务器不了解功能码

0x02 非法的数据地址 与请求有关

0x03 非法的数据值 与请求有关

0x04 服务故障 逆变器通讯模块在执行过程中无法取出数据故障

5. 详细协议描述

0-59 寄存器地址为可读寄存器类型， **0x03** 功能码。
60-499 寄存器地址为可读写寄存器类型， **0x10** 功能码。
500-2000 寄存器地址为可读寄存器类型， **0x03** 功能码。

5.1. 03 读固有属性区，对应功能码 0x03,地址范围 0~59

Addr	Register meaning	R/W	data range	unit	note
100	设备类型 Device type	R			0X03 单相低压储能机 hybird 0X05 三相低压储能机 hybird 0X06 三相高压储能机
103	SN byte 01 SN byte 02	R	‘0’~’9’; ‘A’~’Z’		The serial number is ten ASCII characters, If "AH12345678", Byte 01 is 0x41 (A), The 02nd byte is 0x48 (H), …… The 09th byte is 0x37 (7), The tenth byte is 0x38 (8).
104	SN byte 03 SN byte 04	R	‘0’~’9’; ‘A’~’Z’		
105	SN byte 05 SN byte 06	R	‘0’~’9’; ‘A’~’Z’		
106	SN byte 07 SN byte 08	R	‘0’~’9’; ‘A’~’Z’		
107	SN byte 09 SN byte 10	R	‘0’~’9’; ‘A’~’Z’		
114	控制板固件版本-字段 2 Control panel firmware version-2	R			举例 0x2001 高字节 0x20 为三相低压储能固有 低字节 0x01 为硬件版本号，出厂设定不可更改 密码 for debug
015	**控制板固件版本-主版本** Control panel firmware master	R			举例：0x1001 Bit12-15：数字表示发行版本，大版本区分；F 表示研发内部测试版本 Bit0-11：版本流水号

	version				
116	通讯板固件版本-字段 1 Comm panel firmware version-1	R			
117	通讯板固件版本-字段 2 Comm panel firmware version-2	R			
118	**通讯板固件版本-主版本** Comm panel firmware master version	R			
120	额定功率低字 Rated power low word	R		0.1W	
121	额定功率高字 Rated power high word	R		0.1W	

5.1. 10 可读写可变属性区，对应功能码是 0x10。

Addr	Register meaning	R/W	data range	unit	note
160	远程锁定使能 Remote Lock	R/W			0x0002 关机 turn off 0x0000 开机 turn on
162	系统时间第 1 字节 system time byte 01	R/W	[0,255]	年 Year	MI 以 20 00 年为基值 Based on the year 2000
	系统时间第 2 字节 system time byte 02	R/W	[1,12]	月 Month	
163	系统时间第 3 字节 system time byte 03	R/W	[1,31]	日 Day	
	系统时间第 4 字节 system time byte 04	R/W	[0,23]	时 Hour	
164	系统时间第 5 字节 system time byte 05	R/W	[0,59]	分 Minute	
	系统时间第 6 字节 system time byte 06	R/W	[0,59]	秒 Sec	
177	有功功率调节 Active power regulation	R/W	[0,1200]	0.1%/1%	如 800 表示调节到 80.0% MI If 800, adjust to 80.0%
178	无功功率调节 Reactive power regulation	R/W	[0,1200]	0.1%	如 800 表示调节到 80.0% If 800, adjust to 80.0%

179	视在功率调节 Apparent power regulation	R/W	[0,1200]	0.1%	如 800 表示调节到 80.0% If 800, adjust to 80.0%
180	开关机使能 Switch on and off enable	R/W	[0,1]	-	0：关机 1：开机MI 2：关机 0: power off 1: power on
181	恢复出厂使能 Factory reset enable	R/W	[0,1]		0: disable 1: enable
183	孤岛保护使能 Island protection enable	R/W	[0,1]		0: disable 1: enable
185	GFDI使能 GFDI enable	R/W	[0,1]		0: disable 1: enable 已使用
198	电池充电类型 Control Mode	R/W	-	-	0x0000 Lead-Battery, four-stage charging method 0x0001 Lithium battery
199	Equalization V	R/W	[3800,6100]	0.01V	1480 means 14.8v
200	Absorption V	R/W	[3800,6100]	0.01V	1440 means 14.4v
201	Float V	R/W	[3800,6100]	0.01V	1440 means 14.4v
202	电池容量 Batt Capacity	R/W	[0,2000]	1 Ah	200 means 200AH
203	Empty_v	R/W		0.01V	
204	最小limit起作用功率 ZeroExport power	R/W			
205	均衡充几天执行一次 Equalization day cycle	R/W	[0 90]	Day	
206	均衡充执行时间 Equalization time	R/W	[0 20]	0.5Hour	分辨率 0.5小时 Resolution 0.5 h [0-20]对应 0- 10小时 但是发MCU是[0-100]
207	温度补偿值 TEMPCO	R/W	[0,50]	1mV/℃	带有正负的int型 Signed int
208	电池最大充电电流 Max A Charge	R/W	[0,185]	1A	0-185A
209	电池最大放电电流 Max A discharge	R/W	[0,185]	1A	0-185A
210	保留 undefined	R/W			
211	电池工作根据电压还是容量 battery operates according to voltage	R/W			根据电压 According to the voltage 根据容量 According to the capacity

	or capacity				2　　没有电池 no battery
212	锂电池唤醒标志位 Lithium battery wake up sign bit	R/W			0　enabled 1　Disable
213	电池内阻值 battery resistance value	R/W	[0,6000]	mΩ	
214	电池充电效率 Battery charging efficiency	R/W	[0-100]	0.1%	983表示98.3% 983 is 98.3%
215	电池容量ShutDown battery capacity ShutDown	R/W	[0,100]	1%	低容量截止点 Low capacity cutoff point
216	电池容量Restart battery capacityRestart	R/W	[0,100]	1%	保护恢复点 Protection recovery point
217	电池容量LowBatt battery capacityLowBatt	R/W	[0,100]	1%	
218	电池电压ShutDown battery voltageShutDown	R/W	[3800,6100]	0.01V	低保护点 cutoff　　41V Low protection point cutoff 41V
219	电池电压Restart battery voltageRestart	R/W	[3800,6100]	0.01V	Reboot /recover　　52V
220	电池电压LowBatt battery voltageLowBatt	R/W	[3800,6100]	0.01V	放电深度　　46V Discharge depth 46V
221	发电机最大运行时间 Maximum operating time of generator			0.1 hours	120表示12小时 120 is 12 hours
222	发电机冷却时间 Generator cooling time			0.1 hours	120表示12小时 120 is 12 hours
223	发电机充电启动电压点 Generator charging Starting voltage point	R/W	[0000 6300]	0.01V	电池电压小于这个值发电机开启充电 The battery voltage is less than this value
224	发电机充电启动容量点 Generator charging starting capacity point	R/W	[0000 6300]	1%	电池容量小于这个值发电机开启充电 The battery capacity is less than this value
225	发电机对电池充电电流 Generator charges the	R/W	[0000 185]	1A	发电机对电池充电电流 The generator charges the battery

	battery current				
226	市电充电启动电压点 Grid charging Start voltage point o	R/W	[0000 6300]	0.01v	
227	市电充电启动容量点 Grid charging start capacity point	R/W	[0000 6300]	1%	
228	市电对电池充电电流 Grid charge the battery current	R/W	[0000 185]	1A	市电对电池充电电流 Grid charge the battery current
229	发电机充电使能 Generator is charged to enable	R/W			
230	市电充电使能 Grid is charged to enable	R/W			
231	AC couple 频率上限设置	R/W	5000-6500		5000-6500
232	强制开启发电机作为负载功能 Force on generator as load function	R/W			前提是235号寄存器已经使能1 The premise is that register 234 has enabled 1 0 不强制 Do not force 1 强制 force
233	发电机输入作为负载输出使能 generator input is enabled as the load output	R/W			0 只作为发电机输入 only Gen use 1 智能负载输出 only smart load output 2 使能作为逆变器输入 only microinverter input
234	发电机负载OFF电压 SmartLoad OFF batt Voltage	R/W	[3800 6300]	0.01V	
235	发电机负载OFF电量 SmartLoad OFF batt	R/W	[0000 100]	1%	
236	发电机负载ON电压 SmartLoad ON batt Voltage	R/W	[3800 6300]	0.01V	
237	发电机负载ON电量 SmartLoad ON batt	R/W	[0000 100]	1%	
238	输出电压等级设定 Output voltage level setting	R/W			0 表示220V means 220V 1 表示230V means 230V 2 表示240V means 240V 3 表示120V means 120V 4 133VAC
239	开启发电机的最小	R/W	[0,8000]	1W	

	solar功率 minimum solar power required to start a generator				
240	发电机并网信号 Gen_Grid_Signal On				Bit0 grid signal Bit1 gen signal
241	能量管理模式 Energy management model				Bit0-1 10 电池优先模式 battery first mode 11 负载优先模式 load first mode Bit2-3 表示被动并网功率平衡功能 Represents passive grid-connected power balance function 10 不开启 colse 11 开启 open Bit4-5 表示主动并网功率平衡功能 Represents active grid-connection power balance function 10 不开启 close 11 开启 open
242	limit控制功能 limit control function	R/W		0/1	0x00 使能卖电 sell electricity enabled 0x01 使能内置 built-in enabled 0x02 使能外置 extraposition enabled
243	限制并网最大功率输出 Limit the maximum power output of the grid connection	R/W	[0,8000]	1W	代表总功率 Represents total power
244	外置电流传感器方向 External current sensor clamp phase	R/W	[xx,00]	1W	[11][12]
245	光伏卖电 Solar sell	R/W			0x00光伏不卖电 solar Don't sell 0x01光伏卖电 solar sell
246	高级削峰填谷功能使能 Time of Use Selling enabled	R/W			Bit0 0 disable 1 enable Bit1 Monday 0-disable 1-enable

					Bit2 Tuesday …… Bit7 Sunday
247	三相ABC电网相序设定 Grid Phase	R/W			0 0 120 240 1 0 240 120
248	卖电模式时间点1 Sell mode time point 1	R/W	[0000 2359]		2359表示时间23：59 2359 means time 23:59
249	卖电模式时间点2 Sell mode time point 2	R/W	[0000 2359]		Time
250	卖电模式时间点3 Sell mode time point 3	R/W	[0000 2359]		
251	卖电模式时间点4 Sell mode time point 4	R/W	[0000 2359]		
252	卖电模式时间点5 Sell mode time point5	R/W	[0000 2359]		
253	卖电模式时间点6 Sell mode time point6	R/W	[0000 2359]		
254	卖电模式时间点1功率 Sell mode time point 1 power	R/W	[0000 8000]	1W	受到电池最大放电功率影响 Affected by the maximum discharge power of the battery
255	卖电模式时间点2功率 Sell mode time point 2	R/W	[0000 8000]	1W	Power
256	卖电模式时间点3功率 Sell mode time point 3	R/W	[0000 8000]	1W	
257	卖电模式时间点4功率 Sell mode time point 4	R/W	[0000 8000]	1W	
258	卖电模式时间点5功率 Sell mode time point 5	R/W	[0000 8000]	1W	
259	卖电模式时间点6功率 Sell mode time point 6	R/W	[0000 8000]	1W	
260	卖电模式时间点1电压 Sell mode time point 1	R/W	[0000 6300]	0.01V	受到电池电压的影响 Is affected by the battery
261	卖电模式时间点2电压 Sell mode time point 2	R/W	[0000 6300]	0.01V	Voltage
262	卖电模式时间点3电压 Sell mode time point 3	R/W	[0000 6300]	0.01V	
263	卖电模式时间点4电压 Sell mode time point 4	R/W	[0000 6300]	0.01V	
264	卖电模式时间点5电压 Sell mode time point 5	R/W	[0000 6300]	0.01V	
265	卖电模式时间点6电压 Sell mode time point 6	R/W	[0000 6300]	0.01V	
266	1容量 1 capacity	R/W	[0,100]	1%	Soc
267	2容量 2 capacity	R/W	[0,100]	1%	

268	3容量 3 capacity	R/W	[0,100]	1%	
269	4容量 4 capacity	R/W	[0,100]	1%	
270	5容量 5 capacity	R/W	[0,100]	1%	
271	6容量 6 capacity	R/W	[0,100]	1%	
272	时间点1充电使能 Time point 1 charge enable	R/W	[0,1]		Bit0 grid charging enable Bit1 gen charging enable Bit2 西班牙的GM模式 Bit3 西班牙的BU模式
273	时间点2充电使能 Time point 2 charge enable	R/W	[0,1]		同上
274	时间点3充电使能 Time point 3 charge	R/W	[0,1]		同上
275	时间点4充电使能 Time point 4 charge	R/W	[0,1]		同上
276	时间点5充电使能 Time point 5 charge	R/W	[0,1]		同上
277	时间点6充电使能 Time point 6 charge	R/W	[0,1]		同上
278	控制板特殊功能位 1 Microinverter export to grid cutoff	R/W	[0,1]		需要全部改成两位控制 need two bits control -00无动作-01无动作-10失能-11使能 -00Nowork-01Nowork-10Disable-11Enable Bit0-1 10:Disable 11:enable Bit2-3 10:Gen peak-shaving disable 11:Gen peak-shaving enable Bit4- 5: 10:Grid peak-shaving disable 11:Grid peak-shaving enable Bit6-7 10:On Grid always on disable 11:On Grid always on enable Bit8-9 10:external relay disable 11:external relay enable Bit10-11 10: 锂电池丢失报故障 disable

279	控制板特殊功能位 2 1,外置CT自动检测方向 2,强制脱网	R/W	[0,1]		Bit0-1 10：外置CT自动检测方向 disable Externl ct direction check disable 11：enable Bit2-3 10：强制离网工作 disable Forced off-grid work disable 11：enable
280	恢复并网时间 Restore connection time	R/W	[10 300]		
281	Solar Arc Fault模式开启	R/W	[0 1]		0x00 关闭 Close 0x01 开启 open
282	并网标准 Grid Mode	R/W	[0 1]		0=通用标准 general standard 1= UL1741&IEE1547 2= CPUC RULE21 3= SRD-UL1741 4= CEI 0-21 ……
283	电网频率设置 Grid Frequency	R/W	[0 1]		0x00 50HZ 0x01 60hz
284	电网类型设置 Grid Type 现在是三相，无效	R/W	[0 3]		0x00 单相 默认220V Single-phase 240 v / 230 v / 220 v 0x01 表示两相120V/240V Stands for two-phase 120V/240V 0x02 表示三相系统208V 120度120V Represents the three-phase system 208V 120 degrees 120V 0X03 120V Single Phase
285	电网高压保护点 Grid Vol High	R/W	[1800 2700]	0.1V	
286	电网低压保护点 Grid Vol Low	R/W	[1800 2700]	0.1V	
287	电网频率高保护点 Grid Hz High	R/W	[4500 6500]	0.01Hz	
288	电网频率低保护点 Grid Hz Low	R/W	[4500 6500]	0.01Hz	
289	发电机连接到电网输入端 The generator is	R/W	[1 0]		0 disable 1 enabled

	connected to the grid input				
290	GEN peak shaving Power	R/W	[0 16000]	1w	
291	GRID peak shaving Power	R/W	[0 16000]	1w	
292	Smart Load Open Delay	R/W	[1 120]	1Minute	
293	输出PF值设定（有功调节） Output PF value Settings	R/W	[800 1200]		800表示调整到80% 1200标识调整到120% 800 for 80%, 1200 for 120%
294	外部继电器位 External relay bit	R/W	[0 0xFFFF]		Bit0-8 对应8个继电器位 Bit0-8 corresponds to 8 relay bits
337	Active unbalance load	R/W	[0,1]		
338	unbalance power trip	R/W	[0,65535]		
436	**并联1** Parallel-1				Bit0 1:Parallel Enable 0: Parallel Disable Bit1 1:Master 0:Slave Bit2-7 Void Bit8-9 Phase(00:A,01:B,10:C,11:void) Bit10-15 Modbus SN(0-63)
437	并联2 Parallel-2				
440	光伏最大卖电功率 Max Solar Sell Power		R/W	1W	
444	电网信息监测方式 Grid check from Meter or CT	R/W			BIT00: 0：CT 1：Meter BIT01: -BIT15: undefine
445	电表厂家信息				0：预留 1：Eastron 东鸿 2：CHNT 正泰
447	外置CT变比 CT ratio	R/W		30<--> 30:1	U16
448	外置Meter CT变比 Meter CT ratio	R/W		30<--> 30:1	U16

5.2. 03 只读实时属性区，对应功能码是 0x03。

Addr	Register meaning	R/W	data range	unit	note
600	运行状态 run state	R	[0,5]	-	0000 待机 standby 0001 自检 selfcheck

					0002 正常 normal 0003 告警 alarm 0004 故障 fault
601	逆变器电网侧当日有功发电量 active power generation of today	R	[-32768,32767]	0.1kWh	
602	逆变器电网侧当日无功发电量 reactive power generation of today	R	[-32768,32767]	0.1kVarh	
603	当日并网时间 Grid connection time of today	R	[0,65535]	S	
604	逆变器电网侧总有功发电量低字 active power generation of total low byte	R	[0,0xFFFFFFFF]	0.1kWh	
605	逆变器电网侧总有功发电量高字 active power generation of total high byte	R			
606	逆变器电网侧总无功发电量低字 reactive power generation of total low byte				
607	逆变器电网侧总无功发电量高字 reactive power generation of total high byte				
610	发电量数据-预留	R			
611	发电量数据-预留	R			
612	发电机历史工作时间低字节	R		0.1h	
613	发电机历史工作时间高字节	R		0.1h	
614	电池当日充电量 Today charge of the battery	R		0.1kwh	
615	电池当日放电量 Today discharge of the battery	R		0.1kwh	
616	电池累计充电量低字 Total charge of the	R		0.1kwh	

	battery low byte				
617	电池累计充电量高字 Total charge of the battery high byte	R		0.1kwh	
618	电池累计放电量低字 Total discharge of the battery low byte	R		0.1kwh	
619	电池累计放电量高字 Total discharge of the battery high byte	R		0.1kwh	
620	电网当日购电量 Day_GridBuy_Power Wh	R		0.1kwh	
621	电网当日卖电量 Day_GridSell_Power Wh	R		0.1kwh	
622	电网累计购电量低字 Total_GridBuy_Power Wh_low word	R		0.1kwh	
623	电网累计购电量高字 Total_GridBuy_Power Wh_high word	R		0.1kwh	
624	电网累计卖电量低字 Total_GridSell_Power Wh_low word	R		0.1kwh	
625	电网累计卖电量高字 Total_GridSell_Power Wh_high word	R		0.1kwh	
626	当日用电量 Day_Load_Power Wh	R		0.1kwh	
627	累计用电量低字 Total_Load_Power Wh_low word	R		0.1kwh	
628	累计用电量高字 Total_Load_Power Wh_high word	R		0.1kwh	
629	当日总PV发电量 Day_PV_Power Wh	R	[0,65535]	0.1kWh	
630	当日PV-1发电量 Day_PV-1_Power Wh	R		0.1kWh	
631	当日PV-2发电量 Day_PV-2_Power Wh	R		0.1kWh	
632	当日PV-3发电量 Day_PV-3_Power Wh	R		0.1kWh	
633	当日PV-4发电量 Day_PV-4_Power Wh	R		0.1kWh	
634	历史PV发电量低字 Total PV_power Wh_low word	R		0.1kWh	
635	历史PV发电量高字 Total PV_power Wh_high word	R		0.1kWh	
636	发电机日发电量	R		0.1kWh	

637	发电机总发电量低字节	R		0.1kWh	
638	发电机总发电量高字节	R		0.1kWh	
639	发电机日工作时间 Generator working hours per day	R		0.1h	
640	DC变压器温度 (DCTransformer temperature)	R	[0,3000]	0.1℃	偏移1000
641	散热片温度 Heat sink temperature	R	[0,3000]	0.1℃	
642	预留温度1 undefine	R	[0,3000]	0.1℃	
643	预留温度2 undefine	R	[0,3000]	0.1℃	
644	预留温度3 undefine	R	[0,3000]	0.1℃	
645	负载年用电量低字节 Yer_Loadwh_L	R	[0,0xFFFF]	0.1KWH	
646	负载年用电量高字节 Yer_Loadwh_H	R	[0,0xFFFF]	0.1KWH	
648	通讯板的故障状态 Failure status of communication board	R	[0,0xFFFF]		Bit0 Flash chip error Bit1 time error Bit2 EEPROM error
651	开关机状态 Turn off/on status	R			低4位表示开关信号 0000 关机 power off 0001 开机 power on
652	AC侧继电器状态 AC realy status	R			0 off 1 on Bit0 INV继电器 INV relay Bit1 负载继电器 预留 undefine Bit2 电网继电器 grid relay Bit3 发电机继电器 gen relay Bit4 电网供电继电器 grid give power to relay Bit7 干接点 Dry contact1 Bit8 干接点 Dry contact2()
653	告警信息第 1 字 Warning message word 1	R	[0,65535]		Bit0: reserved Bit1:风扇故障 FAN_WARN Bit2:电网相位错误 grid phase wrong Bit3: ……

					Bit15
654	告警信息第 2 字 Warning message word 2	R	[0,65535]		Bit0 Bit1 …… Bit14 锂电池丢失告警 Bit15 并联通讯质量告警
655	故障信息第 1字 Fault information word 1	R	[0,65535]		见故障信息编码表
656	故障信息第 2字 Fault information word 2	R	[0,65535]		
657	故障信息第 3 字 Fault information word 3	R	[0,65535]		
658	故障信息第 4 字 Fault information word 4	R	[0,65535]		
659	WorkFlag.ON_OFF_Trip_DATA	R			
686	电池温度 battery temperature	R	[0,3000]	0.1℃	
687	电池电压 battery voltage	R		0.01V	
688	电池电量 battery capacity	R	[0,100]	1%	
689	保留 undefined	R			
690	电池输出功率 Battery output power	R		1W	S16
691	电池输出电流 Battery output current	R		0.01A	S16
692	电池校正后的容量 Corrected_AH		[0,3000]	1AH	100 is 100AH
698	电网侧相电压A Grid phase voltage A	R		0.1V	
699	电网侧相电压B Grid phase voltage B	R		0.1V	
700	电网侧相电压C Grid phase voltage C	R		0.1V	
701	电网侧线电压AB Grid line voltage AB	R		0.1V	预留
702	电网侧线电压BC Grid line voltage BC	R		0.1V	
703	电网侧线电压CA Grid line voltage CA	R		0.1V	
704	电网侧内侧A相功率低	R		1W	S16

	16位 A phase power on the inner side of the grid				
705	电网侧内侧B相功率低16位 B phase power on the inner side of the grid	R		1W	S16
706	电网侧内侧C相功率低16位 C phase power on the inner side of the grid	R		1W	S16
707	电网侧-内侧总有功功率低16位 Total active power from side to side of the grid	R		1W	S16
708	电网侧-内侧总视在功率低16位 Grid side - inside total apparent power	R		1W	预留
709	电网侧频率 Grid-side frequency	R			
710	电网侧内侧电流A grid side inner current A	R		0.01A	S16
711	电网侧内侧电流B grid side inner current B	R		0.01A	S16
712	电网侧内侧电流C grid side inner current C	R		0.01A	S16
713	电网外置-电流A Out-of-grid - current A	R		0.01A	S16
714	电网外置-电流B Out-of-grid - current B	R		0.01A	S16
715	电网外置-电流C Out-of-grid - current C	R		0.01A	S16
716	电网外置-功率A低16位 Out-of-grid -power A	R		1W	S16
717	电网外置-功率B低16位 Out-of-grid -power B	R		1W	S16
718	电网外置-功率C低16位 Out-of-grid -power C高16位	R		1W	S16
719	电网外置-总有功功率低16位 Out-of-grid –total power	R		1W	S16

720	电网外置-总视在功率低 16 位 Out-of-grid –total apparent power	R		1VA	S16
721	并网功率因数 PF Grid-connected power factor PF	R	R/W	[0,1000]	真实值*1000
722	电网侧A相功率低16位 Grid side A-phase power Low_Word	R		1W	以下三个寄存器根据内置外置设置变化 The following three registers vary according to the built-in and external Settings
723	电网侧B相功率低16位 Grid side B-phase power Low_Word	R		1W	
724	电网侧C相功率低16位 Grid side C-phase power Low_Word	R		1W	
725	电网侧-总有功功率低16位 Grid side total power Low_Word	R		1W	
727	逆变器输出相电压A Inverter output phase voltage A	R		0.1V	
728	逆变器输出相电压B Inverter output phase voltage B	R		0.1V	
729	逆变器输出相电压C Inverter output phase voltage C	R		0.1V	
730	逆变器输出相电流A Inverter output phase current A	R		0.01A	S16
731	逆变器输出相电流B Inverter output phase current B	R		0.01A	S16
732	逆变器输出相电流C Inverter output phase current C	R		0.01A	S16
733	逆变器输出相功率A低16位 Inverter output phase power A Low_Word	R		1W	S16
734	逆变器输出相功率B Inverter output phase低16位	R		1W	S16

	power B Low_Word				
735	逆变器输出相功率C低16位 Inverter output phase power C Low_Word			1W	S16
736	逆变器输出总有功功率低16位 Inverter output total power Low_Word	R		1W	S16
737	逆变器输出总视在功率低16位 Inverter output total apparent power Low_Word	R		1W	S16
738	逆变器频率 Inverter frequency	R		0.01Hz	U16
740	UPS负载侧相功率A低16位 UPS load-side phase power A Low_Word	R		1W	U16
741	UPS负载侧相功率B低16位 UPS load-side phase power B Low_Word	R		1W	U16
742	UPS负载侧相功率C低16位 UPS load-side phase power C Low_Word	R		1W	U16
743	UPS负载侧总功率低16位 UPS load-sidetotal power Low_Word	R		1W	U16
744	负载测相电压A Load phase voltage A	R		0.1V	U16
745	负载测相电压B Load phase voltage B	R		0.1V	U16
746	负载测相电压C Load phase voltage C			0.1V	U16
747	负载测电流A 无效 Load phase current A no use	R		0.01A	S16
748	负载测电流B 无效 Load phase current B no use	R		0.01A	S16
749	负载测电流C 无效 Load phase current C no use	R		0.01A	S16
750	负载侧相功率A低16位 Load phase power A_L_Word	R		1W	S16
751	负载侧相功率B低16位	R		1W	S16

	Load phasepowerB Low_Word				
752	负载侧相功率C低16位 Load phase poweC Low_Word	R		1W	S16
753	负载侧总有功功率低16位 Load totalpower Low_Word	R		1W	S16
754	负载侧总视在功率预留 Load phase apparent power undefine Low_Word	R		1W	S16
755	负载频率 Load frequency	R		0.01Hz	
756	负载侧相功率 A 高 16 位 Load phase power A High_Word	R		1W	S16
757	负载侧相功率 B 高 16 位 Load phase power B High_Word	R		1W	S16
758	负载侧相功率 C 高 16 位 Load phase power C High_Word	R		1W	S16
759	负载侧总有功功率高 16 位 Load totalpower High_Word	R		1W	S16
760	负载侧总视在功率高 16 位 预留 Load phase apparent power undefine High_Word	R		1W	S16
761	Gen端口的相电压A Phase voltage of Gen port A	R		0.1V	
762	Gen端口的相电压B Phase voltage of Gen port B	R		0.1V	
763	Gen端口的相电压C Phase voltage of Gen port C	R		0.1V	
764	Gen端口的功率A低16	R		1W	

	位 Phase power of Gen port A Low_Word				
765	Gen端口的功率B低16位 Phase power of Gen port B Low_Word	R		1W	
766	Gen端口的功率C低16位 Phase power of Gen port C Low_Word	R		1W	
767	Gen 端口的总功率低16 位 total power of Gen port Low_Word	R		1W	
768	Gen 端口的功率 A 高16 位 Phase power of Gen port A High_Word	R		1W	
769	Gen 端口的功率 B 高16 位 Phase power of Gen port B High_Word	R		1W	
770	Gen 端口的功率 C 高16 位 Phase power of Gen port C High_Word	R		1W	
771	Gen 端口的总功率高16 位 total power of Gen port High_Word	R		1W	
772	PV1输入功率 PV1 input power	R		1W	
773	PV2输入功率 PV2 input power	R		1W	
774	PV3输入功率 PV3 input power	R		1W	
775	PV4输入功率 PV4 input power	R		1W	
776	直流电压1	R	[0,65535]	0.1V	

	Dc voltage 1				
777	直流电流1 Dc current 1	R	[0,65535]	0.1A	
778	直流电压2 Dc voltage 2	R	[0,65535]	0.1V	
779	直流电流2 Dc current 2	R	[0,65535]	0.1A	
780	直流电压3 Dc voltage 3	R	[0,65535]	0.1V	
781	直流电流3 Dc current 3	R	[0,65535]	0.1A	
782	直流电压4 Dc voltage 4	R	[0,65535]	0.1V	
783	直流电流4 Dc current 4	R	[0,65535]	0.1A	
784	预留	R			
785	预留	R			
786	预留	R			
787	电网侧A相功率高16位 Grid side A-phase power high _Word	R		1W	以下三个寄存器根据内置外置设置变化 The following three registers vary according to the built-in and external Settings
788	电网侧B相功率高16位 Grid side B-phase power high _Word	R		1W	
789	电网侧C相功率高16位 Grid side C-phase power high _Word	R		1W	
790	电网侧-总有功功率高16位 Grid side total power high_Word	R		1W	
791	逆变器输出相功率A高16位 Inverter output phase power A high_Word	R		1W	S16
792	逆变器输出相功率B高16位 Inverter output phase power B Low_Word	R		1W	S16
793	逆变器输出相功率C高16位 Inverter output phase power C high _Word			1W	S16
794	逆变器输出总有功功率高16位	R		1W	S16

	Inverter output total power high _Word				
795	逆变器输出总视在功率高16位 Inverter output total apparent power high _Word	R		1W	S16
796	UPS负载侧相功率A高16位 UPS load-side phase power A high _Word	R		1W	U16
797	UPS负载侧相功率B高16位 UPS load-side phase power B high _Word	R		1W	U16
798	UPS负载侧相功率C高16位 UPS load-side phase power C high _Word	R		1W	U16
799	UPS负载侧总功率高16位 UPS load-sidetotal power high _Word	R		1W	U16
800	电网侧内侧A相功率高16位 A phase power on the inner side of the grid high _Word	R		1W	S16
801	电网侧内侧B相功率高16位 B phase power on the inner side of the grid high _Word	R		1W	S16
802	电网侧内侧C相功率高16位 C phase power on the inner side of the grid high _Word	R		1W	S16
803	电网侧-内侧总有功功率 高16位 Total active power from side to side of the grid high _Word	R		1W	S16
804	电网侧-内侧总视在功率高16位 Grid side - inside total apparent power high _Word	R		1W	预留
805	电网外置-功率A高16位 Out-of-grid -power A high _Word	R		1W	S16
806	电网外置-功率B高16位	R		1W	S16

	Out-of-grid -power B high _Word				
807	电网外置-功率C高16位 Out-of-grid -power C high _Word	R		1W	S16
808	电网外置-总有功功率高16位 Out-of-grid –total power high _Word	R		1W	S16

5.3. 故障代码

告警代码

Error code	Description /描述	Solutions/解决方案
W01	reserve	
W02	FAN_WARN	
W03	Grid phase wrong	
W04	meter_Comm_Fail	

5.4. 故障代码：Fault Code

Error code	Description /描述	Solutions/解决方案
F07	DC/DC_Softsart_Fault DC/DC 软起故障	DC/DC softstart fault 1. Check the battery fuse; 2. Restart and check whether it is in normal; 3. Seek help from us, if can’t go back to noarmal state
F10	AuxPowerBoard_Failure 辅助电源故障	Auxiliary power supply failure 1. Wait for minutes then check; 2. Remove wifi plug or other communicator; 3. Seek help from us, if can’t go back to noarmal state
F13	Working mode change 模式切换	Inverter work mode changed 1. wait for a minute and check; 2. Seek help from us, if can't go back to normal state.
F18	AC over current fault of hardware 硬件交流过流	AC side over current fault 1. Please check whether the backup load power and common load power are within the range; 2. Restart and check whether it is in normal; 3. Seek help from us, if can not go back to normal state.
F20	DC over current fault of the hardware 硬件直流过流	DC side over current fault 1. Check PV module connect and battery connect; 2. Turn off the DC switch and AC switch and then wait one minute,then turn on the DC/AC switch again; 3. Seek help from us, if can not go back to normal state.

F22	Tz_EmergSStop_Fault 急停故障（逆变器被锁定）	Tz_EmergSStop_Fault Seek help from us,This failure hardly happens.
F23	AC leakage current is transient over current 瞬时漏电流故障	Leakage current fault 1. Check the cable of PV module and inverter; 2. Restart inverter; 3. Seek help from us, if can not go back to normal state.
F24	DC insulation impedance failure 方阵绝缘阻抗故障	PV isolation resistance is too low 1. Check the connection of PV panels and inverter is firmly and correctly; 2. Check whether the PE cable of inverter is connected to ground; 3. Seek help from us, if can not go back to normal state.
F26	The DC busbar is unbalanced 直流母线不平衡	1. Please wait for a while and check whether it is normal; 2. If still same, and turn off the DC switch and AC switch and wait for one minute and then turn on the DC/AC switch; 3. Seek help from us, if can not go back to normal state.
F29	Parallel_CANBus_Fault 并联通讯故障	This fualt only for inverters working in parallel mode 1. Check the parallel setting according to the instructions; 2. Check the connection of the CANBus; 3. Seek help from us
F35	No AC grid 无市电	No Utility 1. Please confirm grid is lost or not; 2. Check the grid connection is good or not; 3. Check the switch between inverter and grid is on or not; 4. Seek help from us, if can not go back to normal state.
F41	Parallel_system_Stop 并联系统停机故障	In parallel system,due to other inverter faults. 1. Wait for minutes then check all inverters in this parallel system; 2. If inverter can’t go back to normal state, record fault codes of all inverters, then seek help from us.
F42	AC line low voltage 线电压过低故障	Grid voltage fault 1. Check the AC voltage is in the range of standard voltage in specification; 2. Check whether grid AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.

F46/F49	Bcakup_Battery_Fault 备份电池故障	Backup battery fault. 1. Check the battery capacity; 2. Check the connection between batteries and inverters; 3. If inverter can't go back to normal after load reduction, seek help from us
F47	AC over frequency 交流过频	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.
F48	AC lower frequency 交流欠频	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.
F56	DC busbar voltage is too low 母线电压过低	Battery voltage low 1. Check whether battery voltage is too low; 2. If the battery voltage is too low, using PV or grid to charge the battery; 3. Seek help from us, if can not go back to normal state.
F58	BMS communication fault BMS 通讯故障	
F63	ARC fault 拉弧故障	1. ARC fault detection is only for US market; 2. Check PV module cable connection and clear the fault; 3. Seek help from us, if can not go back to normal state.
F64	Heat sink high temperature failure 散热器温度过高	Heat sink temperature is too high 1. Check whether the work environment temperature is too high; 2. Turn off the inverter for 10mins and restart; 3. Seek help from us, if can not go back to normal state.