Protocol for Goodwe Modbus

V1.7

Release Note

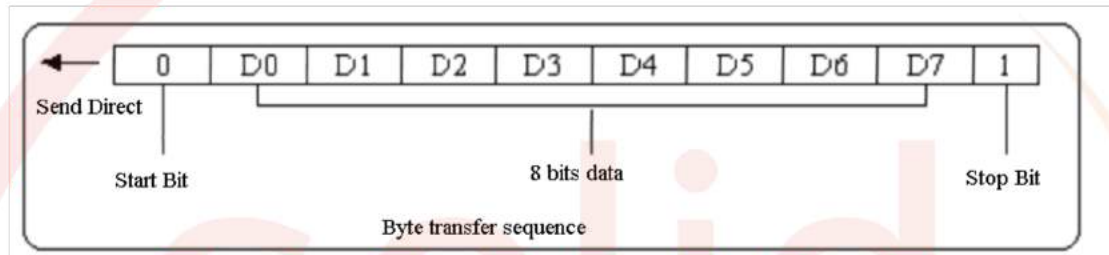| Ver.	Date	Modification		
1.0	20180602	储能协议 分版,支持三相 机种	Sjy	xu
1.1	20180926	1、 增加 GPRS 模块 SIMCCID 地址，35050 2、 增加电池 厂家运 行数据 地址 ，37011 3、 增加地址 安规 VDE 降载 70%，45263	Sjy	Xu
1.2	20181030	增加 485 电池 BMS 协议	Sjy	Xu
1.3	20181128	1、 修改部分 变量类 型 2、 增加安规 部分 modbus地址		
1.4	20190501	1、协议内 容更新 ，格式 调 整	Xu	Xu
1.5	20190821	1、 协议更新 ，增加 电池 bms 信息 2、 增加高低穿等寄存器	Sjy	
1.6	20190903	更新安规 并网等 待时间 和故 障恢复时 间定义	Ls	
1.7	20190926	更新 CEI 自动测 试寄存 器地 址	Sjy	

MODBUS PROTOCOL ANALYSIS

THIS PROTOCOL IS BASED ON MODBUS, **RTU** MODE

1. Bytes Format

Each byte adopts 8 binary codes, with 1 start bit and 1 stop bit during data transmission, totally 10 bits and the

sequence as above: D0 is the lowest significance bit and D7 the highest. Transmission starts from lowest bit to the

highest

2. Communication data format

Data returns in single or two parts

DATA TYPE	REGISTER NO.	BYTES	EXPLANATION
BYTE DATA	1	1	
INTEGER DATA	1	2	Return at one time, from high bit to low bits
LONG INTEGER DATA	2	4	Return in two parts, from high bit to low bits
FLOATING POINT DATA			

3. Frame Format

3.1 Read register (function code 03H)

3.1.1 Frame Format From Host Computer

Sr.	CODE	SAMPLE CODE	EXPLANATION
1	Device Addr.	1	Device communication address（1-247, default as 0xF7）
2	03H	03H	Function Code
3	High Bit of Start Register Addr.	00H	Register Address 0001H
4	Low Bit of Start Register Addr.	01H	
5	High Bit of Register No.	00H	Number of Register 02H

6	Low Bit of Register No.	02H	
7	CRC16 Verification (high bit)	95H	CRC Verification
8	CRC16 Verification (low bit)	CBH	

3.1.2 Frame Format Return from Device（data Reading successfully）

Sr.	CODE	EXPLANATION
1	Device Addr.	Device communication address（1-247, default as 0xF7）
2	03H	Function Code
3	No. of Bytes（2N）	No. of Register Bytes
4	No.1 High Bit of Data	Data 1 High bit
5	No.1 Low Bit of Data	Data 1 Low bit
…	…	○ ○ ○
2N+2	No.N High Bit of Data	Data N High bit
2N+3	No.N Low Bit of Data	Data N Low bit
2N+4	CRC16 Verification (high bit)	CRC Verification
2N+5	CRC16 Verification (low bit)	CRC Verification

3.1.3 Frame Format Return from Device (Register Addr. or register number is wrong)

Sr.	CODE	EXPLANATION
1	Device Address	Device communication address（1-247）
2	83H	Function Code
3	02H	Error Code
4	CRC16 Verification (high bit)	CRC Verification
5	CRC16 Verification (low bit)	CRC Verification

3.2 Writing register（function code 10H）

3.2.1 Frame Format From Host Computer

Sr.	CODE	SAMPLE CODE	EXPLANATION
1	Device Addr.	0xF7	Device communication address（1-247, default as 0xF7）
2	10H	10H	Function Code
3	High Bit of Start Register Addr.	00H	Register Address　0000H
4	Low Bit of Start Register Addr.	00H	
5	High Bit of Register No.	00H	Number of Register　01H
6	Low Bit of Register No.	01H	
7	No. of Bytes（N）	02H	No. of Register Bytes　02H

8	High Bit of Data	0AH	Data 0AF0H
9	Low Bit of Data	F0H	
10	CRC16 Verification (high bit)	A0H	CRC Verification
11	CRC16 Verification (low bit)	B4H	

3.2.2 FrameFormat Return from Device（data writing successfully）

Sr.	CODE	SAMPLE CODE	EXPLANATION
1	Device Addr.	0xF7	Device communication address（1-247）
2	10H	10H	Function Code
3	High Bit of Start Register Addr.	00H	Register Address 0000H
4	Low Bit of Start Register Addr.	00H	
5	High Bit of Register No.	00H	Number of Register 01H
6	Low Bit of Register No.	01H	
7	CRC16 Verification (high bit)	01H	CRC Verification
8	CRC16 Verification (low bit)	C9H	

3.2.3 FrameFormat Return from Device（data error）

Sr.	CODE	EXPLANATION
1	Device Address	Device communication address（1-247）
2	90H	Function Code
3	03H	Error Code
4	CRC16 Verification (high bit)	CRC Verification
5	CRC16 Verification (low bit)	

3.2.4 FrameFormat Return from Device (Register Addr. or register number is wrong)

Sr.	CODE	EXPLANATION
1	Device Address	Device communication address（1-247）
2	90H	Function Code
3	02H	Error Code
4	CRC16 Verification (high bit)	CRC Verification
5	CRC16 Verification (low bit)	

3.3 Writing single register（function code 06H）

3.3.1 Frame Format From Host Computer

Sr.	CODE	SAMPLE CODE	EXPLANATION	
1	Device Addr.	1	Device communication address（1-247）	
2	06H	06H	Function Code	
3	High Bit of Start Register Addr.	00H	Register Address 0000H	
4	Low Bit of Start Register Addr.	00H		
5	High Bit of Data	0AH	Data 0AF0H	
6	Low Bit of Data	F0H		
7	CRC16 Verification (high bit)	8FH	CRC Verification	
8	CRC16 Verification (low bit)	2EH		

3.3.2 Frame Format Return from Device（data writing successfully)

Sr.	CODE	SAMPLE CODE	EXPLANATION
1	Device Addr.	1	Device communication address（1-247）
2	06H	06H	Function Code
3	High Bit of Start Register Addr.	00H	Register Address 0000H
4	Low Bit of Start Register Addr.	00H	
5	High Bit of Data	0AH	Data 0AF0H
6	Low Bit of Data	F0H	
7	CRC16 Verification (high bit)	8FH	CRC Verification
8	CRC16 Verification (low bit)	2EH	

3.3.3 ErrorCode Returned From Inverter Device

02H: Register address fault or overflow of read register number

03H: Data error

04H: Built-in verification code error

05H: Communication time-out

4.baudrate：9600

5.Device address：from 1 to 247, default as 247.

6.Function code

03H:Reading

06H: writing single register

10H:writing multiple registers

7.CRC Verification

7.1 CRCVerification formula: $X^{16}+X^{12}+X^5+1$

7.2 CRC Verification code refer to No.10 Chapter.

江苏固德威电源科技有限公司
JIANGSU GOODWE POWER SUPPLY TECHNOLOGY CO.,LTD.

8．Modbus address and explanation

ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
35000	Modbus protocol version	RO	U16	N/A	1	1	
35001	Rated power	RO	U16	N/A	1	1	
35002	AC output type	RO	U16	N/A	1	1	0:single phase 1：three phase four wire system 2：three phase three wire system
35003	Serial number	RO	STR	N/A	1	8	ASCII，16 bytes
35011	Device type	RO	STR	N/A	1	5	ASCII，10 bytes
35016	DSP1 software version	RO	U16	N/A	1	1	
35017	DSP2 software version	RO	U16	N/A	1	1	
35018	DSP SVN version	RO	U16	N/A	1	1	
35019	ARM software version	RO	U16	N/A	1	1	
35020	ARM SVN version	RO	U16	N/A	1	1	
35021	DSP Internal Firmware Ver	RO	STR	N/A	1	6	Example '04004-13-S01'
35027	ARM Internal Firmware Ver	RO	STR	N/A	1	6	Example '02034-04-S01'
35050	SIMCCID	RO	STR	N/A	1	10	For GPRS module
Running data							
35100		RO	U16	N/A	1	1	Hbyte-year/Lbyte-month：13-99/1-12
35101	RTC	RO	U16	N/A	1	1	Hbyte-day/Lbyte-hour：1-31/0-23
35102		RO	U16	N/A	1	1	Hbyte-minute/Lbyte-second：0-59/0-59
35103	Vpv1	RO	U16	V	10	1	PV1 voltage
35104	Ipv1	RO	U16	A	10	1	PV1 current
35105	Ppv1	RO	U32	W	10	2	PV1 Power
35107	Vpv2	RO	U16	V	10	1	PV2 voltage
35108	Ipv2	RO	U16	A	10	1	PV2 current
35109	Ppv2	RO	U32	W	10	2	PV2 Power
35111	Vpv3	RO	U16	V	10	1	PV3 voltage
35112	Ipv3	RO	U16	A	10	1	PV3 current
35113	Ppv3	RO	U32	W	10	2	PV3 Power
35115	Vpv4	RO	U16	V	10	1	PV4 voltage
35116	Ipv4	RO	U16	A	10	1	PV4 current
35117	Ppv4	RO	U32	W	10	2	PV4 Power
35119	PV Mode	RO	U32	N/A		2	PV Module work mode,refer to Table 8-3 8-4
35121	Vgrid_R	RO	U16	V	10	1	R phase Grid voltage
35122	Igrid_R	RO	U16	A	10	1	R phase Grid current
35123	Fgrid_R	RO	U16	Hz	100	1	R phase Grid Frequency
35124	Reversed					1	Reversed
35125	Pgrid_R	RO	S16	W	1	1	R phase Grid Power
35126	Vgrid_S	RO	U16	V	10	1	S phase Grid voltage
35127	Igrid_S	RO	U16	A	10	1	S phase Grid current

35128	Fgrid_S	RO	U16	Hz	100	1	S phase Grid Frequency
35129	Reversed					1	Reversed
35130	Pgrid_S	RO	S16	W	1	1	S phase Grid Power
35131	Vgrid_T	RO	U16	V	10	1	T phase Grid voltage
35132	Igrid_T	RO	U16	A	10	1	T phase Grid current
35133	Fgrid_T	RO	U16	Hz	100	1	T phase Grid Frequency
35134	Reversed						Reversed
35135	Pgrid_T	RO	S16	W	1	1	T phase Grid Power
35136	Grid Mode	RO	U16			1	Grid mode, refer to Table 8-10
35137	Reversed					1	Reversed
35138	Total INV Power	RO	S16	W	1	1	Total Power of Inverter
35139	Reversed					1	Reversed
35140	AC ActivePower	RO	S16	W	1	1	
35141	Reversed					1	Reversed
35142	AC ReactivePower	RO	S16	Var	1	1	
35143	Reversed					1	Reversed
35144	AC ApparentPower	RO	S16	VA	1	1	
35145	Back-Up Vload_R	RO	U16	V	10	1	R phase Load voltage of Back-Up
35146	Back-Up Iload_R	RO	U16	A	10	1	R phase Load current of Back-Up
35147	Back-Up Fload_R	RO	U16	Hz	100	1	R phase Load Frequency of Back-Up
35148	Load Mode_R	RO	U16			1	Load work mode, refer to Table 8-11
35149	Reversed					1	Reversed
35150	Back-Up Pload_R	RO	S16	W	1	1	R phase Load Power of Back-Up
35151	Back-Up Vload_S	RO	U16	V	10	1	S phase Load voltage of Back-Up
35152	Back-Up Iload_S	RO	U16	A	10	1	S phase Load current of Back-Up
35153	Back-Up Fload_S	RO	U16	Hz	100	1	S phase Load Frequency of Back-Up
35154	Load Mode_S	RO	U16			1	Load work mode, refer to Table 8-11
35155	Reversed					1	Reversed
35156	Back-Up Pload_S	RO	S16	W	1	1	S phase Load Power of Back-Up
35157	Back-Up Vload_T	RO	U16	V	10	1	T phase Load voltage of Back-Up
35158	Back-Up Iload_T	RO	U16	A	10	1	T phase Load current of Back-Up
35159	Back-Up Fload_T	RO	U16	Hz	100	1	T phase Load Frequency of Back-Up
35160	Load Mode_T	RO	U16			1	Load work mode, refer to Table 8-11
35161	Reversed					1	Reversed
35162	Back-Up Pload_T	RO	S16	W	1	1	T phase Load Power
35163	Reversed					1	Reversed
35164	PLoad_R	RO	S16	W	1	1	R phase Load Power
35165	Reversed					1	Reversed
35166	Pload_S	RO	S16	W	1	1	S phase Load Power

35167	Reversed					1	Reversed
35168	Pload_T	RO	S16	W	1	1	T phase Load Power
35169	Reversed					1	Reversed
35170	Total Back-Up Load	RO	S16	W	1	1	Load Power of Back-Up
35171	Reversed					1	Reversed
35172	Total Load Power	RO	S16	W	1	1	Total Power of load
35173	Ups Load Percent	RO	U16	%	100	1	
35174	Air temperature	RO	S16	C	10	1	Inverter internal temperature
35175	Module temperature	RO	S16	C	10	1	
35176	Radiator temperature	RO	S16	C	10	1	
35177	FunctionBitValue	RO	U16			1	
35178	BUSVoltage	RO	U16	V	10	1	BUSVoltage
35179	NBUSVoltage	RO	U16	V	10	1	NBUSVoltage
35180	Vbattery1	RO	U16	V	10	1	First group battery voltage
35181	Ibattery1	RO	S16	V	10	1	First group battery current
35182	Reversed					1	Reversed
35183	Pbattery1	RO	S16	W	1	1	First group battery power
35184	Battery1 Mode	RO	U16			1	First group battery work mode, refer to Table 8-9
35185	Warning code	RO	U16			1	
35186	SafetyCountry	RO	U16			1	
35187	Work Mode	RO	U16			1	refer to Table 8-1
35188	Operation Mode	RO	U16			1	Storage Inverter work mode, refer to Table 8-12
35189	Error Message	RO	U32			2	Failure description for status 'failure' Table 8-2
35191	PV E-Total	RO	U32	1KW.Hr	10	2	Total PV Energy
35193	PV E-Day	RO	U32	1KW.Hr	10	2	PV Engery in today
35195	E-Total	RO	U32	1KW.Hr	10	2	Total Feed Energy to grid
35197	h-Total	RO	U32	H	1	2	Total feeding hours
35199	E-Day-Sell	RO	U16	1KW.Hr	10	1	Feed Engery to grid in today
35200	E-Total-Buy	RO	U32	1KW.Hr	10	2	
35202	E-Day-Buy	RO	U16	1KW.Hr	10	1	
35203	E-Total-Load	RO	U32	1KW.Hr	10	2	Total Energy of Load
35205	E-Load-Day	RO	U16	1KW.Hr	10	1	Energy of load in day
35206	E-BatteryCharge	RO	U32	1KW.Hr	10	2	Charge energy
35208	E-Charge-Day	RO	U16	1KW.Hr	10	1	Energy of charge in day
35209	E-BatteryDischarge	RO	U32	1KW.Hr	10	2	Discharge energy
35211	E-discharge-Day	RO	U16	1KW.Hr	10	1	Energy of discharge in day
35212	BattStrings	RO	U16	Pcs	1	1	
35213	CPLD warning code	RO	U16			1	
35214	wChargerCtrlFlg	RO	U16			2	
35215	Derate Flag	RO	U16			1	Safty power curve flag
35216	Derate frozen power	RO	S32	W		2	Safty curve power
35218	DiagStatusH	RO	U32			2	
35220	DiagStatusL	RO	U32			2	

External communication data（ARM）							
36000	commode	RO	U16			1	
36001	RSSI	RO	U16			1	
36002	ManufacturerCode	RO	U16			1	EMS protocol code
36003	bMeterConnectStatus	RO	U16			1	1：connect correctly，2：connect reverse，3：connect incorrectly，0：not checked
36004	Meter communicate Status	RO	U16			1	1：OK 0：NG
36005	MTActivepowerR	RO	S16	W	1	1	Pmeter R
36006	MTActivepowerS	RO	S16	W	1	1	Pmeter S
36007	MTActivepowerT	RO	S16	W	1	1	Pmeter T
36008	MTTotalActivepower	RO	S16	W	1	1	Pmeter
36009	MTTotalReactivepower	RO	U16	W	1	1	
36010	MeterPF_R	RO	U16		100	1	Meter power factor R
36011	MeterPF_S	RO	U16		100	1	Meter power factor S
36012	MeterPF_T	RO	U16		100	1	Meter power factor T
36013	MeterPowerFactor	RO	U16		100	1	Meter power factor
36014	MeterFrequence	RO	U16		100	1	
36015	E-Total-Sell	RO	float	1Kwh	10	2	
36017	E-Total-Buy	RO	float	1Kwh	10	2	
36019	MTActivepowerR	RO	S32	W	1	2	Pmeter R
36021	MTActivepowerS	RO	S32	W	1	2	Pmeter S
36023	MTActivepowerT	RO	S32	W	1	2	Pmeter T
36025	MTTotalActivepower	RO	S32	W	1	2	Pmeter
36027	MTReactivepowerR	RO	S32	W	1	2	Phase R reactive power
36029	MTReactivepowerS	RO	S32	W	1	2	Phase S reactive power
36031	MTReactivepowerT	RO	S32	W	1	2	Phase T reactive power
36033	MTTotalReactivepower	RO	S32	W	1	2	Total reactive power
36035	MTApparentpowerR	RO	S32	W	1	2	Phase R apparent power
36037	MTApparentpowerR	RO	S32	W	1	2	Phase S apparent power
36039	MTApparentpowerR	RO	S32	W	1	2	Phase T apparent power
36041	MTTotalApparentpower	RO	S32	W	1	2	Total apparent power
36043	Meter Type	RO	U16	NA	1	1	
36044	Meter software version	RO	U16	NA	1	1	

Flash information							
ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
36900	FlashPgmParaVer	RO	U16	NA	1	1	
36901	FlashPgmWriteCount	RO	U32	NA	1	2	
36903	FlashSysParaVer	RO	U16	NA	1	1	
36904	FlashSysWriteCount	RO	U32	NA	1	2	
36906	FlashBatParaVer	RO	U16	NA	1	1	
36907	FlashBatWriteCount	RO	U32	NA	1	2	
36909	FlashEepromVer	RO	U16	NA	1	1	
36910	FlashEepromWriteCount	RO	U32	NA	1	2	
36912	WiFiDataSendCount	RO	U16	NA	1	1	

ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
36913	WifiUpDataDebug	RO	U16	NA	1	1	

BMS information							
ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
37000	DRMStatus	RO	U16			1	Refer Table 8-15
37001	BattTypeIndex	RO	U16		1	1	Battery manufactor index setting
37002	BMS Status	RO	U16			1	BMS Work Status
37003	BMS Pack Temperature	RO	U16		10	1	
37004	BMS Charge Imax	RO	U16		1	1	
37005	BMS Discharge Imax	RO	U16		1	1	
37006	BMS Error Code L	RO	U16			1	Bit 0~16 refer to Table 8-7
37007	SOC	RO	U16	%	1	1	First group battery capacity
37008	BMS SOH	RO	U16	%	1	1	
37009	BMS Battery strings	RO	U16	Pcs	1	1	
37010	BMS Warning Code L	RO	U16			1	Bit 0~16 refer to Table 8-8
37011	Battery protocol	RO	U16			1	
37012	BMS Error Code H	RO	U16	NA	NA	1	
37013	BMS Warning Code H	RO	U16	NA	NA	1	
37014	BMS Software Version	RO	U16	NA	1	1	
37015	Battery Hardware Version	RO	U16	NA	1	1	
37016	Maximum cell temperature ID	RO	U16	NA	1	1	
37017	Minimum cell temperature ID	RO	U16	NA	1	1	
37018	Maximum cell voltage ID	RO	U16	NA	1	1	
37019	Minimum cell voltage ID	RO	U16	NA	1	1	
37020	Maximum cell temperature	RO	U16	℃	10	1	
37021	Minimum cell temperature	RO	U16	℃	10	1	
37022	Maximum cell voltage	RO	U16	mV	1	1	
37023	Minimum cell voltage	RO	U16	mV	1	1	
37024	Pass Infomation1	RO	U16	NA	NA	1	
37025	Pass Infomation2	RO	U16	NA	NA	1	
37026	Pass Infomation3	RO	U16	NA	NA	1	
37027	Pass Infomation4	RO	U16	NA	NA	1	
37028	Pass Infomation5	RO	U16	NA	NA	1	
37029	Pass Infomation6	RO	U16	NA	NA	1	
37030	Pass Infomation7	RO	U16	NA	NA	1	
37031	Pass Infomation8	RO	U16	NA	NA	1	
37032	Pass Infomation9	RO	U16	NA	NA	1	
37033	Pass Infomation10	RO	U16	NA	NA	1	
37034	Pass Infomation11	RO	U16	NA	NA	1	
37035	Pass Infomation12	RO	U16	NA	NA	1	
37036	Pass Infomation13	RO	U16	NA	NA	1	
37037	Pass Infomation14	RO	U16	NA	NA	1	
37038	Pass Infomation15	RO	U16	NA	NA	1	
37039	Pass Infomation16	RO	U16	NA	NA	1	
37040	Pass Infomation17	RO	U16	NA	NA	1	
37041	Pass Infomation18	RO	U16	NA	NA	1	

ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
37042	Pass Infomation19	RO	U16	NA	NA	1	
37043	Pass Infomation20	RO	U16	NA	NA	1	
37044	Pass Infomation21	RO	U16	NA	NA	1	
37045	Pass Infomation22	RO	U16	NA	NA	1	
37046	Pass Infomation23	RO	U16	NA	NA	1	
37047	Pass Infomation24	RO	U16	NA	NA	1	
37048	Pass Infomation25	RO	U16	NA	NA	1	
37049	Pass Infomation26	RO	U16	NA	NA	1	
37050	Pass Infomation27	RO	U16	NA	NA	1	
37051	Pass Infomation28	RO	U16	NA	NA	1	
37052	Pass Infomation29	RO	U16	NA	NA	1	
37053	Pass Infomation30	RO	U16	NA	NA	1	
37054	Pass Infomation31	RO	U16	NA	NA	1	
37055	Pass Infomation32	RO	U16	NA	NA	1	

BMS detail information							
ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
37100	BMS Flag	RO	U16	NA	NA	1	
37101	BMS Work Mode	RO	U16	NA	NA	1	
37102	BMS Allow Charge Power	RO	U32	W	1	2	
37104	BMS Allow Discharge Power	RO	U32	W	1	2	
37106	BMS Relay Status	RO	U16	NA	NA	1	
37107	Battery Module Number	RO	U16	NA	NA	1	
37108	BMS Shutdown Fault Code	RO	U16	NA	NA	1	
37109	Battery Ready Enable	RO	U16	NA	NA	1	
37110	Alarm Under temperature ID	RO	U16	NA	NA	1	
37111	Alarm Over temperature ID	RO	U16	NA	NA	1	
37112	Alarm Differ temperature ID	RO	U16	NA	NA	1	
37113	Alarm Charge Current ID	RO	U16	NA	NA	1	
37114	Alarm Discharge Current ID	RO	U16	NA	NA	1	
37115	Alarm Cell Over Voltage ID	RO	U16	NA	NA	1	
37116	Alarm Cell Under Voltage ID	RO	U16	NA	NA	1	
37117	Alarm SOC Lower ID	RO	U16	NA	NA	1	
37118	Alarm Cell Voltage Differ ID	RO	U16	NA	NA	1	
37119	Battery1 Current	RO	S16	A	10	1	
37120	Battery2 Current	RO	S16	A	10	1	
37121	Battery3 Current	RO	S16	A	10	1	
37122	Battery4 Current	RO	S16	A	10	1	
37123	Battery5 Current	RO	S16	A	10	1	
37124	Battery6 Current	RO	S16	A	10	1	
37125	Battery7 Current	RO	S16	A	10	1	
37126	Battery8 Current	RO	S16	A	10	1	
37127	Battery1 SOC	RO	U16	%	1	1	
37128	Battery2 SOC	RO	U16	%	1	1	
37129	Battery3 SOC	RO	U16	%	1	1	
37130	Battery4 SOC	RO	U16	%	1	1	
37131	Battery5 SOC	RO	U16	%	1	1	

37132	Battery6 SOC	RO	U16	%	1	1	
37133	Battery7 SOC	RO	U16	%	1	1	
37134	Battery8 SOC	RO	U16	%	1	1	
37135	Battery1 SN	RO	U32	NA	NA	2	
37137	Battery2 SN	RO	U32	NA	NA	2	
37139	Battery3 SN	RO	U32	NA	NA	2	
37141	Battery4 SN	RO	U32	NA	NA	2	
37143	Battery5 SN	RO	U32	NA	NA	2	
37145	Battery6 SN	RO	U32	NA	NA	2	
37147	Battery7 SN	RO	U32	NA	NA	2	
37149	Battery8 SN	RO	U32	NA	NA	2	
For CEI autotest							
38000	Work Mode	RO	U16	NA	NA	1	
38001	Error Message H	RO	U16	NA	NA	1	
38002	Error Message L	RO	U16	NA	NA	1	
38003	SimVoltage	RO	U16	V	10	1	
38004	SimFrequency	RO	U16	Hz	100	1	
38005	TestResult	RO	U16	NA	NA	1	
38006	NA	RO	U16		NA	1	
38007	NA	RO	U16		NA	1	
38008	Vac1	RO	U16	V	10	1	
38009	Fac1	RO	U16	Hz	100	1	
38010	Pac 1	RO	U16	W	1	2	
38012	Line1AvgFaultValue	RO	U16	V	10	1	
38013	Line1AvgFaultTime	RO	U16	s	1	1	
38014	Line1VHighfaultValue	RO	U16	V	10	1	
38015	Line1VHighfaultTime	RO	U16	ms	1	1	
38016	Line1VLowfaultValueS1	RO	U16	V	10	1	
38017	Line1VLowfaultTimeS1	RO	U16	ms	1	1	
38018	Line1VLowfaultValueS2	RO	U16	V	10	1	
38019	Line1VLowfaultTimeS2	RO	U16	ms	1	1	
38020	Line1FHighfaultValueCom	RO	U16	Hz	100	1	
38021	Line1FhighfaultTimeCom	RO	U16	ms	1	1	
38022	Line1FlowfaultValueCom	RO	U16	Hz	100	1	
38023	Line1FlowfaultTimeCom	RO	U16	ms	1	1	
38024	Line1FHighfaultValue	RO	U16	Hz	100	1	
38025	Line1FHighfaultTime	RO	U16	ms	1	1	
38026	Line1FLowfaultValue	RO	U16	Hz	100	1	
38027	Line1FLowfaultTime	RO	U16	ms	1	1	
38028	Vac2	RO	U16	V	10	1	
38029	Fac2	RO	U16	Hz	100	1	
38030	Pac 2	RO	U16	W	1	2	
38032	Line2AvgFaultValue	RO	U16	V	10	1	
38033	Line2AvgFaultTime	RO	U16	s	1	1	
38034	Line2VHighfaultValue	RO	U16	V	10	1	
38035	Line2VHighfaultTime	RO	U16	ms	1	1	
38036	Line2VLowfaultValueS1	RO	U16	V	10	1	

38037	Line2VLowfaultTimeS1	RO	U16	ms	1	1	
38038	Line2VLowfaultValueS2	RO	U16	V	10	1	
38039	Line2VLowfaultTimeS2	RO	U16	ms	1	1	
38040	Line2FHighfaultValueCom	RO	U16	Hz	100	1	
38041	Line2FhighfaultTimeCom	RO	U16	ms	1	1	
38042	Line2FlowfaultValueCom	RO	U16	Hz	100	1	
38043	Line2FlowfaultTimeCom	RO	U16	ms	1	1	
38044	Line2FHighfaultValue	RO	U16	Hz	100	1	
38045	Line2FHighfaultTime	RO	U16	ms	1	1	
38046	Line2FLowfaultValue	RO	U16	Hz	100	1	
38047	Line2FLowfaultTime	RO	U16	ms	1	1	
38048	Vac3	RO	U16	V	10	1	
38049	Fac3	RO	U16	Hz	100	1	
38050	Pac 3	RO	U16	W	1	2	
38052	Line3AvgFaultValue	RO	U16	V	10	1	
38053	Line3AvgFaultTime	RO	U16	s	1	1	
38054	Line3VHighfaultValue	RO	U16	V	10	1	
38055	Line3VHighfaultTime	RO	U16	ms	1	1	
38056	Line3VLowfaultValueS1	RO	U16	V	10	1	
38057	Line3VLowfaultTimeS1	RO	U16	ms	1	1	
38058	Line3VLowfaultValueS2	RO	U16	V	10	1	
38059	Line3VLowfaultTimeS2	RO	U16	ms	1	1	
38060	Line3FHighfaultValueCom	RO	U16	Hz	100	1	
38061	Line3FhighfaultTimeCom	RO	U16	ms	1	1	
38062	Line3FlowfaultValueCom	RO	U16	Hz	100	1	
38063	Line3FlowfaultTimeCom	RO	U16	ms	1	1	
38064	Line3FHighfaultValue	RO	U16	Hz	100	1	
38065	Line3FHighfaultTime	RO	U16	ms	1	1	
38066	Line3FLowfaultValue	RO	U16	Hz	100	1	
38067	Line3FLowfaultTime	RO	U16	ms	1	1	

Power limit							
ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
38450	Feed Power Limit Coefficient	RO	U16	‰	1	1	
38451	L1 Power Limit	RO	U16	W	1	1	
38452	L2 Power Limit	RO	U16	W	1	1	
38453	L3 Power Limit	RO	U16	W	1	1	
38454	Inverter Power Factor	RO	S16	1	1000	1	
38455	PV MeterDC Power	RO	S32	W	1	2	
38457	Etotal Grid Charge	RO	U32	1KW.Hr	10	2	
38459	Dispatch Switch	RO	U16	NA	1	1	
38460	Dispatch Power	R0	S32	W	1	2	
38462	Dispatch Soc	RO	U16	%	1	1	
38463	Dispatch Mode	RO	U16	NA	1	1	

Setting parameter							
ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
45000	Reserved	RW	STR	N/A	1	8	

45008	Reserved	RW	STR	N/A	1	8	
45016	Reserved	RW	STR	N/A	1	8	
45024	Router SSID	RW	STR	N/A	1	30	
45054	Router password	RW	STR	N/A	1	20	
45074	Router encryption method	RW	STR	N/A	1	1	
45075	Domain1	RW	STR	N/A		25	
45100	Port number1	RW	U16	N/A		1	
45101	Domain2	RW	STR	N/A		25	
45126	Port number2	RW	U16	N/A		1	
45127	Modbus address	RW	U16	N/A	1	1	[0-247]
45128	Manufacturer	RW	STR	N/A		4	
45132	485 Modbus baudrate	RW	U32	N/A	1		[9600,115200]
45200		RW	U16	N/A	1	1	13-99/1-12
45201	RTC	RW	U16	N/A	1	1	1-31/0-23
45202		RW	U16	N/A	1	1	0-59/0-59
45203	Serial number	RW	STR	N/A	1	8	ASCII，16 bytes
45211	Device type	RW	STR	N/A	1	5	ASCII，10 bytes
45216	Resume factory setting	RW	U16	N/A	1	1	[0]
45217	Clear data	RW	U16	N/A	1	1	[0]
45218	Start（allow connect to grid)	WO	U16	N/A	1	1	[0]
45219	Stop（forbidden connect to grid)	WO	U16	N/A	1	1	[0]
45220	Reset	WO	U16	N/A	1	1	[0]
45221	Reset SPS	WO	U16	N/A		1	
45222	PV E-Total	RW	U32	1KW.H	10	2	[0-247]
45224	PV E-Day	RW	U32	1KW.H	10	2	
45226	E-Total-Sell	RW	U32	1KW.H	10	2	
45228	h-Total	RW	U32	H	1	2	
45230	E-Day-Sell	RW	U16	1KW.H	10	1	
45231	E-Total-Buy	RW	U32	1KW.H	10	2	
45233	E-Day-Buy	RW	U16	1KW.H	10	1	
45234	E-Total-Load	RW	U32	1KW.H	10	2	
45236	E-Load-Day	RW	U16	1KW.H	10	1	
45237	E-BatteryCharge	RW	U32	1KW.H	10	2	
45239	E-Charge-Day	RW	U16	1KW.H	10	1	
45240	E-BatteryDischarge	RW	U32	1KW.H	10	2	
45242	E-discharge-Day	RW	U16	1KW.H	10	1	
45243	Language	RW	U16	N/A	1	1	[0,20]
45244	Safety country code	RW	U16	N/A	1	1	SafetyCountry [0,65535]
45245	ISO	RW	U16	千欧	1	1	Iso Limit [0,1000]
45246	LVRT	RW	U16	N/A	1	1	[0,1]
45247	Islanding	RW	U16	N/A	1	1	[0,1]
45248	NA	RW	U16	N/A	1	1	
45249	burn in reset time	RW	U16	MIN	1	1	[0,2880]
45250	PV start voltage	RW	U16	V	10	1	[1800,8500]
45251	EnableMPPT4Shadow	RW	U16		1	1	MPPT shadow scan enable(1 :on 0 :off)

45252	BackUpEnable	RW	U16		1	1	Backup Output on(1 :on 0 :off)
45253	AutoStartBackup	RW	U16		1	1	Offgrid Auto startup(1 :on 0 :off)
45254	GridWaveCheckLevel	RW	U16		1	1	0：High 1：low 2：close
45255	RapaidCutOff	RW	U16		1	1	0 :off 1 :on
45256	BackupStartDly	RW	U16		1	1	Backup Start Delay
45257	UpsStdVoltType	RW	U16		1	1	
45258	Reserved	RW	U16		1	1	
45259	Burn in mode	RW	U16		1	1	
45260	Backup overload delay	RW	U16	s	1	1	
45261	UpsPhaseType	RW	U16		1	1	
45262	NA	RW	U16		1	1	
45263	DerateRate(VDE)	RW	U16		1	1	70：Derate 70%
45264	Three Phase unbalanced output	RW	U16		1	1	[0,1] All power needs to be turned off and restarted
45265	Pe Relay CheckEnable	RW	U16		1	1	[0,1]
45266	HighImpMode	RW	U16		1	1	[0,1]
45267	BatSpFunc	RW	U16		1	1	
45268	AFCI Shut off PWM	RW	U16		1	1	[0,1]
45330	Device License	WO	STR	N/A	1	3	3
45333	User License	RW	STR	N/A	1	3	3
45336	Remote User License	RW	STR	N/A	1	3	3
45339	Remote Lock Code	RW	STR	N/A	1	3	3
Battety Parament							
45350	LeadBatCapacity	RW	U16		1	1	[25,2000]
45351	BattStrings	RW	U16		1	1	[4~12] N
45352	BattChargeVoltMax	RW	U16		10	1	[500*N,600*N]
45353	BattChargeCurrMax	RW	U16		10	1	[0,1000]
45354	BattVoltUnderMin	RW	U16		10	1	[400*N,480*N]
45355	BattDisChgCurrMax	RW	U16		10	1	[0,1000]
45356	BattSOCUnderMin	RW	U16		1	1	[0,100]
45357	BattOfflineVoltUnderMin	RW	U16		10	1	[400*N,480*N]
45358	BattOfflineSOCUnderMin	RW	U16			1	[0,100]
45359	NA			MIN		1	
45360	Clear battery setting	W0	U16			1	
Safty							
45400	GridVoltHighS1	RW	U16	V	10	1	
45401	GridVoltHighS1Time	RW	U16	periods	1	1	
45402	GridVoltLowS1	RW	U16	V	10	1	
45403	GridVoltLowS1Time	RW	U16	periods	1	1	
45404	GridVoltHighS2	RW	U16	V	10	1	
45405	GridVoltHighS2Time	RW	U16	periods	1	1	
45406	GridVoltLowS2	RW	U16	V	10	1	Decide by specific safty regulations
45407	GridVoltLowS2Time	RW	U16	periods	1	1	
45408	GridVoltQualit	RW	U16	V	10	1	
45409	GridFreqHighS1	RW	U16	Hz	100	1	

45410	GridFreqHighS1Time	RW	U16	periods	1	1	
45411	GridFreqLowS1	RW	U16	Hz	100	1	
45412	GridFreqLowS1Time	RW	U16	periods	1	1	
45413	GridFreqHighS2	RW	U16	Hz	100	1	
45414	GridFreqHighS2Time	RW	U16	periods	1	1	
45415	GridFreqLowS2	RW	U16	Hz	100	1	
45416	GridFreqLowS2Time	RW	U16	periods	1	1	
45417	GridVoltHigh	RW	U16	V	10	1	
45418	GridVoltLow	RW	U16	V	10	1	
45419	GridFreqHigh	RW	U16	Hz	100	1	
45420	GridFreqLow	RW	U16	Hz	100	1	
45421	GridStartTime	RW	U16	s	1	1	

ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
45422	GridVoltRecoverHigh	RW	U16	V	10	1	
45423	GridVoltRecoverLow	RW	U16	V	10	1	
45424	GridFreqRecoverHigh	RW	U16	Hz	100	1	Decide by specific safty regulations
45425	GridFreqRecoverLow	RW	U16	Hz	100	1	
45426	GridRecoverTime	RW	U16	s	1	1	
45427	Reserved	RW	U16	s	1	1	
45428	Power rate limit (generate)	RW	U16		100	1	功率斜率
45429	Power rate limit (reconnect)	RW	U16		100	1	
45430	Power rate limit (reduction)	RW	U16		100	1	
45431	GridProtect	RW	U16		1	1	1:enable 0:disable
45432	power slope enable	RW	U16		1	1	1:enable 0:disable
cos φ (P) curve							
45433	EnableCurve	RW	U16		1	1	1:enable 0:disable
45434	PointAValue	RW	U16	W	1	1	
45435	PointA_PF	RW	U16	%	100	1	
45436	PointBValue	RW	U16	W	1	1	
45437	PointB_PF	RW	U16	%	100	1	
45438	PointCValue	RW	U16	W	1	1	
45439	PointC_PF	RW	U16	%	100	1	
45440	lock in voltage	RW	U16	V	10	1	[2300,2530]
45441	lock out voltage	RW	U16	V	10	1	[2070,2300]
45442	lock out power	RW	S16	W	1	1	[-11000,11000]
Power and frequency curve							
45443	EnableCurve	RW	U16		1	1	bit0：ON/OFF 0：off 1：on bit1：response mode 1：fstop 0：slope
45444	Ffrozen-DCH　（frequency of Pm)	RW	U16	Hz	100	1	fstop
45445	Ffrozen-CH　（frequency of Pm)	RW	U16	Hz	100	1	
45446	fstop-DCH	RW	U16	Hz	100	1	

45447	fstop-CH	RW	U16	Hz	100	1	
45448	Recovery waiting time	RW	U16	s	1	1	
45449	Recovery frequency1	RW	U16	Hz	100	1	
45450	Recovery frequency2	RW	U16	Hz	100	1	
45451	Recovery slope	RW	U16		1	1	
45452	Ffrozen-DCH (frequency of Pm)	RW	U16	Hz	100	1	slope
45453	Ffrozen-CH (frequency of Pm)	RW	U16	Hz	100	1	
45454	down slope power reference	RW	U16		1	1	
45455	down slope	RW	U16		1	1	
QU curve							
45456	EnableCurve		U16		1		
45457	lock in power	RW	U16	W	1	1	
45458	lock out power	RW	U16	W	1	1	
45459	V1 voltage	RW	U16	V	10	1	
45460	V1 value (var % rated VA)	RW	U16	W	1	1	
45461	V2 voltage	RW	U16	V	10	1	
45462	V2 value (var % rated VA) (Select one set: K value or V2 value & V3 value)	RW	U16	W	1	1	
45463	V3 voltage	RW	U16	V	10	1	
45464	V3 value (var % rated VA) (Select one set: K value or V2 value & V3 value)	RW	U16	W	1	1	
45465	V4 voltage	RW	U16	V	10	1	
45466	V4 value (var % rated VA)	RW	U16	W	1	1	
45467	K value (Select one set: K value or V2 value & V3 value)	RW	U16		1	1	
45468	time constant	RW	U16		1	1	
45469	Miscellanea	RW	U16			1	
45470	Rated Voltage(korea)	RW	U16			1	
45471	response time(korea)	RW	U16			1	
PU curve							
45472	PU curve	RW	U16		1	1	
45473	Power change rate	RW	U16			1	
45474	V1 voltage	RW	U16	V	10	1	
45475	V1 value ((P/Pn)%)	RW	S16		10	1	
45476	V2 voltage	RW	U16	V	10	1	
45477	V2 value ((P/Pn)%)	RW	S16		10	1	
45478	V3 voltage	RW	U16	V	10	1	
45479	V3 value ((P/Pn)%)	RW	S16		10	1	
45480	V4 voltage	RW	U16	V	10	1	
45481	V4 value ((P/Pn)%)	RW	S16		10	1	
45482	Fixed Power Factor	RW	U16		100	1	Refer to table 8-18
45483	Fixed reactive power	RW	U16		10	1	
45484	Fixed active power	RW	U16		10	1	
45485	GridLimitByVolStartVol	RW	U16	V	10	1	Grid limit start volt (JAPAN)
45486	GridLimitByVolStartPer	RW	U16	%	1	1	Grid limit start percent

ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
							(JAPAN)
45487	GridLimitByVolSlope	WO	U16	%/V	1	1	Grid limit slope (JAPAN)
45488	Auto Test Enable	WO	U16			1	0(stop)/1(start)
45489	Auto Test step	WO	U16			1	0~8
45490	uwItalyFreqMode	RW	U16			1	
45491	All Power Curve Disable	RW	U16			1	[0,1]
45492	R phase fixed active power	RW	U16	‰		1	[0,1000]
45493	S phase fixed active power	RW	U16	‰		1	[0,1000]
45494	T phase fixed active power	RW	U16	‰		1	[0,1000]
45495	GridVoltHighS3	RW	U16	V	10	1	[1*Vn,1.36*Vn]
45496	GridVoltHighS3Time	RW	U16	periods	1	1	[1,65535]
45497	GridVoltLowS3	RW	U16	V	10	1	[0.15*Vn,1*Vn]
45498	GridVoltLowS3Time	RW	U16	periods	1	1	[1,65535]
45499	ZvrtConfig	RW	U16			1	0:disable 1: only low voltage ride through enable 2: only high voltage ride through enable 3: both enable
45500	LvrtStartVolt	RW	U16	V	10	1	[0,2300]
45501	LvrtEndVolt	RW	U16	V	10	1	[0,2300]
45502	LvrtStartTripTime	RW	U16	periods	1	1	[1,65535]
45503	LvrtEndTripTime	RW	U16	periods	1	1	[1,65535]
45504	LvrtTripLimitVolt	RW	U16	V	10	1	[0,2300]
45505	HvrtStartVolt	RW	U16	V	10	1	[2300,3000]
45506	HvrtEndVolt	RW	U16	V	10	1	[2300,3000]
45507	HvrtStartTripTime	RW	U16	periods	1	1	[1,65535]
45508	HvrtEndTripTime	RW	U16	periods	1	1	[1,65535]
45509	HvrtTripLimitVolt	RW	U16	V	10	1	[2300,3000]
meter control（ARM）							
ADRRESS	NAME	R/W	TYPE	UNIT	Mutiple	Number	Remark
47000	AppModeIndex	RW	U16			1	0:selfuse mode 1: off gird mode 2: backup mode 3:economic mode
47001	MeterCheckValue	RW	U16			1	[0,60000]
47002	MeterConnectCheckFlag	RW	U16			1	0:stop checking 2: wait for check 1: checking
47003	Simulate meter power	RW	U16			1	
47004	Breeze on/off	RW	U16			1	1:ON 0:OFF
47005	Log data enable	RW	U16			1	1:ON 0:OFF
47006	data send interval	RW	U16	s	5	1	[0,256]
47007	DRED cmd	RW	U16			1	
47008	Led test flag	W	U16			1	
47009	wifi or lan switch	W	U16			1	4:wifi 5:lan
47010	Dred OffGrid Check	W	U16			1	1:on 0:off

47011	ExternalEMSFlag		U16			1	0:nomal 10:Alpha
47012	LED Blink time	RW	U16	s		1	
47013	wifi led state	RW	U16			1	1 off 2 on 3 flash 1x 4 flash 2x 5 flash 4x
47014	com led state	RW	U16			1	1 off 2 on 3 flash 1x 4 flash 2x 5 flash 4x
Battery control data （ARM）							
47500	StopSocProtect	RW	U16			1	[0,1]
47501	BattFloatVolt	RW	U16	V	10	1	[500*N,600*N] N :battery strings
47502	BattFloatCurr	RW	U16	A	10	1	[0,100]
47503	BattToFloatTime	RW	U16	MIN	1	1	[10,30]
47504	BattTypeIndex	RW	U16			1	[0,511]
47505	ManufacturerCode	RW	U16			1	
47506	DCVoltOutput/KeepBattVolt On	RW	U16			1	
47507	BattAvgChgVolt	RW	U16	V	10	1	
47508	BatAvgChgHours	RW	U16	H	1	1	
47509	FeedPowerEnable	RW	U16			1	[0,1]
47510	FeedPowerPara	RW	U16	W	1	1	[0,10000]
47511	EMSPowerMode	RW	U16			1	Refer to table 8-16
47512	EMSPowerSet	RW	U16			1	[0,10000]
47513	BatBMSCurrLmtCoff	RW	U16		100	1	[1,200]
47514	Battery protocol	RW	U16			1	[0,511]
47515	StartTime_1	RW	U16	HH:MM		1	[0,23],[0,59]
47516	EndTime_1	RW	U16	HH:MM		1	[0,23],[0,59]
47517	BatPowerPercent_1	RW	U16	%		1	[-100,100]
47518	WorkWeek_1	RW	U16			1	refer to Table 8-20
47519	StartTime_2	RW	U16	HH:MM		1	[0,23],[0,59]
47520	EndTime_2	RW	U16	HH:MM		1	[0,23],[0,59]
47521	BatPowerPercent_2	RW	U16	%		1	[-100,100]
47522	WorkWeek_2	RW	U16			1	refer to Table 8-20
47523	StartTime_3	RW	U16	HH:MM		1	[0,23],[0,59]
47524	EndTime_3	RW	U16	HH:MM		1	[0,23],[0,59]
47525	BatPowerPercent_3	RW	U16	%		1	[-100,100]
47526	WorkWeek_3	RW	U16			1	refer to Table 8-20
47527	StartTime_4	RW	U16	HH:MM		1	[0,23],[0,59]
47528	EndTime_4	RW	U16	HH:MM		1	[0,23],[0,59]
47529	BatPowerPercent_4	RW	U16	%		1	[-100,100]
47530	WorkWeek_4	RW	U16			1	refer to Table 8-20
47531	SOC start to force charge	RW	U16			1	
47532	SOC stop force charge	RW	U16			1	
47533	Clear all economic mode	WO	U16			1	1:CLEAR

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47534	3 Phase FeedPowerEnable	RW	U16			1	[0,1]
47535	R phase FeedPowerPara	RW	U16	W	1	1	[0,5000]
47536	S phase FeedPowerPara	RW	U16	W	1	1	[0,5000]
47537	T phase FeedPowerPara	RW	U16	W	1	1	[0,5000]
47538	Stop SOCAdjust	RW	U16			1	[0,1]
47539	Wifi Reset	WO	U16			1	[0,1]
47540	ARM Soft Reset	WO	U16			1	
BMS for RS485							
47900	BMSVersion	RW	U16			1	
47901	BattStrings	RW	U16	Pcs	1	1	
47902	wBMSBatChargeVMax	RW	U16	V	10	1	
47903	wBMSBatChargeIMax	RW	U16	A	10	1	
47904	wBMSBatDisChargeVMin	RW	U16	V	10	1	
47905	wBMSBatDisChargeIMax	RW	U16	A	10	1	
47906	wBMSBatVoltage	RW	U16	V	10	1	
47907	wBMSBatCurrent	RW	U16	A	10	1	
47908	wBMSBatSOC	RW	U16	%	1	1	
47909	wBMSBatSOH	RW	U16	%	1	1	
47910	wBMSBatTemperature	RW	S16	℃	10	1	
47911	BMSWarningCode	RW	U32			1	refer to Table 8-8
47913	BMSAlarmCode	RW	U32			1	refer to Table 8-7
47915	BMSStatus	RW	U16			1	Bit set 1 means: Bit0: force to charge Bit1: Stop charging Bit2: Stop discharging
47916	EBMSCommLossDisable	RW	U16			1	1 :Cancel EMS mode BMS communication timeout detection

Table 8-1 Operation Mode

Mode	Code	Description
Wait	0x00	cut off all the connection to Inverter
On-Grid	0x01	PV intputs to Inverter,Inverter outputs to Grid
Off-Grid	0x02	PV inputs to Inverter(First),Battery inputs to Inverter(Second),Inverter work as AC source
Fault	0x03	Fault,fault mode,something is in fault mode
Flash	0x04	Inverter upgrade
Check	0x05	Power on self-check of inverter

Table 8-2 ErrorMessage

Bit NO	Error message	Description
Bit31	Internal Communication Failure	Communication between microcontrollers is failure

Bit30	EEPROM R/W Failure	EEPROM cannot be read or written
Bit29	Fac Failure	The grid frequency is out of tolerable range
Bit28	DSP communication failure	Communication between ARM and DSP is failure
Bit27	PhaseAngleFailure	Phase angle out of range（110°~140°）
Bit26	TBD	NA
Bit25	Relay Check Failure	Relay check is failure
Bit24	TBD	NA
Bit23	Vac Consistency Failure	Different value between Master and Slave for grid voltage
Bit22	Fac Consistency Failure	Different value between Master and Slave for grid frequency
Bit21	TBD	NA
Bit20	Back-Up Over Load	NA
Bit19	DC Injection High	The DC injection to grid is too high
Bit18	Isolation Failure	Isolation resistance of PV-plant out of tolerable range
Bit17	Vac Failure	Grid voltage out of tolerable range
Bit16	External Fan Failure	The external fan failure
Bit15	PV Over Voltage	Pv input voltage is over the tolerable maximum value
Bit14	Utility Phase Failure	Utility Phase Failure
Bit13	Over Temperature	Temperature is too high
Bit12	InternalFan Failure	The fan in case failure
Bit11	DC Bus High	Dc bus is too high
Bit10	Gournd I Failure	Ground current is too high
Bit9	Utility Loss	Utility is unavailable
Bit8	AC HCT Failure	AC HCT check failure 3 times
Bit7	Relay Device Failure	Relay check failure 3 times
Bit6	GFCI Device Failure	GFCI check failure 3 times
Bit5	TBD	NA
Bit4	GFCI Consistency Failure	Different value between Master and Slave for GFCI
Bit3	DCI Consistency Failure	Different value between Master and Slave for output DC current
Bit2	TBD	NA
Bit1	AC HCT Check Failure	The output current sensor is abnormal
Bit0	GFCI Device Check Failure	The GFCI detecting circuit is abnormal

Table 8-3PV Mode

Byte	Description
0	PV1 moderefer to under table
1	PV2 mode refer to under table

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| 2 | PV3 mode refer to under table |
| 3 | PV4 mode refer to under table |

Table 8-4PV Mode Code

Mode Code	Description
0x00	NO PV,inverter disconnects to PV
0x01	Standby,PV does not output power
0x02	Work, PV output power

Table 8-7BMS Alarm Code

Alarm value							
Bit31	Bit30	Bit29	Bit28	Bit27	Bit26	Bit25	Bit24~Bit16
Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
Charging over-voltage3	Discharging under-voltage3	Cell High temperature3	Communication failure2	Charging circuit Failure	Discharge circuit Fault	Battery Lock	Battery break
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DC bus fault	Precharge fault	Discharging overcurrent2	Charging overcurrent2	CellLow temperature2	CellHigh temperature2	Discharging under-voltage2	Charging over-voltage2

Table 8-8BMS Warning Code

Warning value							
Bit31~Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
Reserved	Reserved	Reserved	Reserved	System High temperature	System Low temperature2	System Low temperature1	Cell-imbalance
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
System Reboot	communication failure1	Discharging over-current1	Charging over-current1	Cell Low temperature1	Cell High temperature1	Discharging under-voltage1	Charging over-voltage1

Table 8-9Battery Status

Mode Code	Description
0x00	No Battery,inverter disconnects to Battery
0x01	Standby,no diacharging and no charging
0x02	Discharging
0x03	Charging
0x04	Waiting for charge
0x05	Waiting for discharge

Table 8-10 Grid Status

Mode Code	Description
0x00	Loss, inverter disconnects to Grid
0x01	OK, inverter connects to Grid
0x02	Fault,something is wrong

Table 8-11 Backup Status

Mode Code	Description
0x00	ON,inverter connects to Load
0x01	OFF, inverter disconnects to Load

Table 8-12 Operation Mode

Mode Code	Description
0x01	cut off all the connection to Inverter(wait mode)
0x02	PV intputs to Inverter,Inverter outputs to Grid(online mode)
0x04	PV inputs to Inverter(First),Battery inputs to Inverter(Second),Inverter work as AC source(battery mode)
0x10	Fault,fault mode,something is in fault mode(fault mode)

Table 8-13 Energy Status

Code	Description
0x00	Inverter neither send power to Grid, nor get power from Grid.
0x01	Inverter sends power to Grid

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0x02	Inverter gets power from Grid.

Table 8-14Diagnostic Status

Bit	诊 断 内 容	说 明	类 别
0	BatteryVoltLow	电池电压低不放电	影响电池放电
1	BatterySOCLow	电池 SOC低不放电	
2	BatterySOCInBack	电池 SOC未恢复到再次放电水平	
3	BMSDischargeDisable	BMS 不允许放电	
4	DischargeTimeOn	强制放电时间未设置 1：On 0：OFF	
5	ChargeTimeOn	强制充电时间被设置 1：On 0：OFF	
6	DischargeDriveOn	放电驱动已经打开	
7	BMSDischgCurrentLow	放电电流给定太小(BMS 限值)	
8	DischargeCurrentLow	放电电流给定太小（APP 限值）	
9	MeterCommLoss	EzMeter通讯失败，可能未接	
10	MeterConnectReverse	EzMeter 接反	
11	SelfUseLoadLight	自用负载过轻，不满足放电启动条件	
12	EMSDischargeIZero	EMS控制放电限流为 0	
13	DischargeBUSHigh	PV电要过高导致不放电	
14	BatteryDisconnect	电池未连接或者电池关机，不放电不充电	影响电池充电
15	BatteryOvercharge	电池充电过充	
16	BMSOverTemperature	锂电池过温；确认下过温发生时如果当前电池处于放电状体是如何处理的？继续放电是不合适的(过温放电限流递减直至 0)	
17	BMSOvercharge	锂电池过充，也可能单体电压过高	
18	BMSChargeDisable	锂电池不允许充电	
19	SelfUseOff	自用模式关闭	影响电池放电
20	SOCDeltaOverRange	SOC跳变，电压保护参数不合理或容量设置错误	其 他 问 题
21	BatterySelfDischarge	电池长时间小电流放电（APP结合市电丢失和 PV信息给出诊断）SOC连续自放率超过 30%	
22	OffgridSOCLow	离网 SOC低提示	
23	GridWaveUnstable	电网波形不好，频繁切换离网	
24	FeedPowerLimit	防逆流被设置	

25	PFValueSet	功率因素值被设置	
26	RealPowerLimit	有功功率值被设置	
27	DCOutputOn		
28	SOCProtectOff		
29	Discharge mode for BP	白天和夜晚放电或仅夜晚放电	

Table 8-15 DRM Status

Bit NO	DRMx	Description
Bit0	DRM0	DRM0 Switch : 1 ON/0 OFF
Bit1	DRM1	DRM1 Switch : 1 ON/0 OFF
Bit2	DRM2	DRM2 Switch : 1 ON/0 OFF
Bit3	DRM3	DRM3 Switch : 1 ON/0 OFF
Bit4	DRM4	DRM4 Switch : 1 ON/0 OFF
Bit5	DRM5	DRM5 Switch : 1 ON/0 OFF
Bit6	DRM6	DRM6 Switch : 1 ON/0 OFF
Bit7	DRM7	DRM7 Switch : 1 ON/0 OFF
Bit8	DRM8	DRM8 Switch : 1 ON/0 OFF
Bit9		
Bit10		
Bit11		
Bit12		
Bit13		
Bit...		
Bit15	DRED Connect Status	DRED Status : 1 Connect / 0 Disconnect

Table 8-16 EMS Power Mode

Application scenarios	MODE	COMMAND		PV	Grid	Bat
		EMSPowerMode	EMSPowerSet	Power priority		
				Green is the control object		
System shutdown	Stopped	0x00FF	NA			
	Note :Stop working and switch to wait mode					
Selfuse	Auto	0x0001	NA			
	Note : PBattery =PInv -Pmeter - Ppv（Discharge/Charge） The battery power is controlled by the meter power when the meter communication is normal.					

Control the battery to keep charging	Charge-PV	0x0002	Xmax [2]	High	Low [1]	Energy In
	Note :PBattery =Xmax＋PV（Charge） Xmax is to allow the power to be taken from the grid, and PV power is preferred. When set to 0, only PV power is used.Charging power will be limited by charging current limit.					
Control the battery to keep discharging	Dischg+PV	0x0003	Xmax	High	Energy Out	Low
	Note : PBattery = Xmax（Discharge） Xmax is the allowable discharge power of the battery. When the power fed into the grid is limited, PV power will be used first.					
The inverter is used as a unit for power grid energy scheduling	Import-AC	0x0004	Xset [3]	Low	High	Energy In
	Note :PBattery = Xset＋PV（Charge） Xset refers to the power purchased from the power grid. The power purchased from the grid is preferred. If the PV power is too large, the MPPT power will be limited.(grid side load is not considered)					
	Export-AC	0x0005	Xset	High	Energy Out	Low
	Note : PBattery = Xset（Discharge） Xset is to sell power to the grid. PV power is preferred. When PV energy is insufficient, the battery will discharge.PV power will be limited by x.(grid side load is not considered)					
Off-grid reservation mode Mode	Conserve	0x0006	NA			
	Note : PBattery = PV（Charge） In on-grid mode, the battery is continuously charged, and only PV power (AC Couple model takes 10% of the rated power of the power grid) is used. The battery can only discharge in off-grid mode.					
Off-Grid Mode	Off-Grid	0x0007	NA			
	Note : PBattery =Pbackup－ Ppv（Charge/Discharge） Forced off-grid operation.					
No battery mode for hybrid inverter	Battery standby	0x0008	NA			

	Note : PBattery =0（Standby） The battery does not charge and discharge					
Regional energy management	Buy Power	0x0009	Xset	Low	High	Energy In/Out
	Note :PBattery = PInv － （Pmeter ＋Xset）－Ppv（Charge/Discharge） When the meter communication is normal, the power purchased from the power grid is controlled as Xset. When the PV power is too large, the MPPT power will be limited. When the load is too large, the battery will discharge.					
	Sell Power	0x000A	Xset	High	Energy Out	Low
	Note : PBattery = PInv － （Pmeter －Xset）－Ppv（Charge/Discharge） When the communication of electricity meter is normal, the power sold from the power grid is controlled as Xset, PV power is preferred, and the battery discharges when PV energy is insufficient. PV power will be limited by Xset.					
Force the battery to work at set power value	Charge-BAT	0x000B	Xset	High	Low	Energy In
	Note : PBattery = Xset（Charge） Xset is the charging power of the battery. PV power is preferred. When PV power is insufficient, it will buy power from the power grid. The charging power is also affected by the charging current limit.					
	Discharge-BAT	0x000C	Xset	Low	Energy In	High
	Note : PBattery = Xset（Discharge） Xset is the discharge power of the battery, and the battery discharge has priority. If the PV power is too large, MPPT will be limited. Discharge power is also affected by discharge current limit.					

Remark:

[1] for low-priority energy sources, when the battery charging power is limited or the rated output power of the inverter is limited, the load shall be reduced first.

[2] Xmax represents the upper limit of the power control value, and the actual power will be adjusted according to the working condition.

[3] Xset represents the target value of power control, and the actual power must reach the set value.

Table 8-17CPLD Warning Code

VALUE	Error message
1	PV1 Over Current HW

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2	PV2 Over Current HW
3	Battery Over Current HW
4	Bus Over Voltage HW
5	R InvOverCurr HW
6	S InvOverCurr HW
7	T InvOverCurr HW
8	BatRelayFail

Table 8-18Power Factor

Data	Description	Data	Description
1	0.99 lagging	80	0.80 leading
2	0.98 lagging	81	0.81 leading
3	0.97 lagging	82	0.82 leading
4	0.96 lagging	83	0.83 leading
5	0.95 lagging	84	0.84 leading
6	0.94 lagging	85	0.85 leading
7	0.93 lagging	86	0.86 leading
8	0.92 lagging	87	0.87 leading
9	0.91 lagging	88	0.88 leading
10	0.90 lagging	89	0.89 leading
11	0.89 lagging	90	0.90 leading
12	0.88 lagging	91	0.91 leading
13	0.87 lagging	92	0.92 leading
14	0.86 lagging	93	0.93 leading
15	0.85 lagging	94	0.94 leading
16	0.84 lagging	95	0.95 leading
17	0.83 lagging	96	0.96 leading
18	0.82 lagging	97	0.97 leading
19	0.81 lagging	98	0.98 leading
20	0.80 lagging	99	0.99 leading
		100	1

Table 8-20Weekly schedule

	Bit NO	Definition
High byte	Bit15~8	0xFF :enable 0x00 : disable
Low byte	Bit7	NA
	Bit6	Saturday
	Bit5	Friday
	Bit4	Thursday
	Bit3	Wednesday
	Bit2	Tuesday
	Bit1	Monday
	Bit0	Sunday

10.CRC16

```
const INT8U  auchCRCHi[]  = {0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
                0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
                0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
                0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
                0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
                0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
                0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
                0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
                0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
                0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
                0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
                0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
                0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
                0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
                0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
                0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40
                };

const INT8U  auchCRCLo[]  = { 0x00, 0xC0, 0xC1, 0x01, 0xC3, 0x03, 0x02, 0xC2, 0xC6, 0x06, 0x07, 0xC7, 0x05, 0xC5, 0xC4, 0x04,
                0xCC, 0x0C, 0x0D, 0xCD, 0x0F, 0xCF, 0xCE, 0x0E, 0x0A, 0xCA, 0xCB, 0x0B, 0xC9, 0x09, 0x08, 0xC8,
                0xD8, 0x18, 0x19, 0xD9, 0x1B, 0xDB, 0xDA, 0x1A, 0x1E, 0xDE, 0xDF, 0x1F, 0xDD, 0x1D, 0x1C, 0xDC,
                0x14, 0xD4, 0xD5, 0x15, 0xD7, 0x17, 0x16, 0xD6, 0xD2, 0x12, 0x13, 0xD3, 0x11, 0xD1, 0xD0, 0x10,
                0xF0, 0x30, 0x31, 0xF1, 0x33, 0xF3, 0xF2, 0x32, 0x36, 0xF6, 0xF7, 0x37, 0xF5, 0x35, 0x34, 0xF4,
                0x3C, 0xFC, 0xFD, 0x3D, 0xFF, 0x3F, 0x3E, 0xFE, 0xFA, 0x3A, 0x3B, 0xFB, 0x39, 0xF9, 0xF8, 0x38,
                0x28, 0xE8, 0xE9, 0x29, 0xEB, 0x2B, 0x2A, 0xEA, 0xEE, 0x2E, 0x2F, 0xEF, 0x2D, 0xED, 0xEC, 0x2C,
                0xE4, 0x24, 0x25, 0xE5, 0x27, 0xE7, 0xE6, 0x26, 0x22, 0xE2, 0xE3, 0x23, 0xE1, 0x21, 0x20, 0xE0,
                0xA0, 0x60, 0x61, 0xA1, 0x63, 0xA3, 0xA2, 0x62, 0x66, 0xA6, 0xA7, 0x67, 0xA5, 0x65, 0x64, 0xA4,
                0x6C, 0xAC, 0xAD, 0x6D, 0xAF, 0x6F, 0x6E, 0xAE, 0xAA, 0x6A, 0x6B, 0xAB, 0x69, 0xA9, 0xA8, 0x68,
```

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0x78, 0xB8, 0xB9, 0x79, 0xBB, 0x7B, 0x7A, 0xBA, 0xBE, 0x7E, 0x7F, 0xBF, 0x7D, 0xBD, 0xBC, 0x7C,
0xB4, 0x74, 0x75, 0xB5, 0x77, 0xB7, 0xB6, 0x76, 0x72, 0xB2, 0xB3, 0x73, 0xB1, 0x71, 0x70, 0xB0,
0x50, 0x90, 0x91, 0x51, 0x93, 0x53, 0x52, 0x92, 0x96, 0x56, 0x57, 0x97, 0x55, 0x95, 0x94, 0x54,
0x9C, 0x5C, 0x5D, 0x9D, 0x5F, 0x9F, 0x9E, 0x5E, 0x5A, 0x9A, 0x9B, 0x5B, 0x99, 0x59, 0x58, 0x98,
0x88, 0x48, 0x49, 0x89, 0x4B, 0x8B, 0x8A, 0x4A, 0x4E, 0x8E, 0x8F, 0x4F, 0x8D, 0x4D, 0x4C, 0x8C,
0x44, 0x84, 0x85, 0x45, 0x87, 0x47, 0x46, 0x86, 0x82, 0x42, 0x43, 0x83, 0x41, 0x81, 0x80, 0x40
};

```c
INT16U sCRC16(INT8U *puchMsg, INT16U usDataLen)
{
    INT8U uchCRCHi = 0xFF ;
    INT8U uchCRCLo = 0xFF ;
    INT8U uIndex ;
    while (usDataLen--)
    {
        uIndex = uchCRCHi ^ *puchMsg++ ;
        uchCRCHi = uchCRCLo ^ auchCRCHi[uIndex] ;
        uchCRCLo = auchCRCLo[uIndex] ;
    }
    return ((INT16U)uchCRCHi  << 8 | uchCRCLo) ;
}
```