Solinteg 储能逆变器 Modbus 寄存器表

Solinteg Hybrid Inverter Modbus Register Table

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2022/12/06	00.02	1.表 1.1.3 增加 10120 (故障 FLAG3) 解析 Table 1.2.3 add 10120 (Fault FLAG3) description 2.表 1.1.4 增加 25000、28000~28015 等安规参数相关寄存器 Table 1.2.4 add registers 25000、28000~28015, etc. 3.增加表 1.1.10 国家安规编码解析表 Add table 1.2.10 National safety code description	Yong.Liu	Yong.Liu
2023/06/26	00.03	1.寄存器表及附录独立为单独文件 Separate the register table and appendices into separate files. 2.表 1.1.1 中增加 33020~33023 电池充放电限制寄存器 Table 1.2.1 add registers 33020~33023 Battery charge and discharge limitation. 3.表 1.1.4 增加 28101~28102 10min 过压相关寄存器，50011 N_PE 检测开关 寄存器 Table 1.2.4 add registers 28101~28102 10 min over Voltage and 50011 N_PE check. 4.表 1.1.7 更新电池品牌匹配选项，增加 No Battery 和 Default HV_1 电池选项 Table 1.2.7 Update battery matching list and add No Battery、Default HV_1 options.	Yong.Liu	Gavin.xu

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1. 寄存器表 Register Table

1.1. 中文

表 1.1.1 Solinteg 逆变器 RO 寄存器表

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
1	10000	8	设备 SN 号	RO	STR	N/A	1	按字节解析为字符
	.....							
2	10008	1	机种信息	RO	U16	N/A	1	信息解析见表 3.2
3	10011	2	固件版本号	RO	U32	N/A	1	按字节解析
	10012							
4	10100	1	时间：年/月	RO	U16	N/A	1	连续读取
5	10101	1	时间：日/时	RO	U16	N/A	1	
6	10102	1	时间：分/秒	RO	U16	N/A	1	
7	10104	1	安规代码	RO	U16	N/A	1	
8	10105	1	逆变器工作状态	RO	U16	N/A	1	0:wait,等待并网 1:check,自检 2:On Grid,并网发电 3:fault,设备故障 4:flash,固件更新 5.Off Grid,离网发电
9	10112	2	故障 FLAG1	RO	U32	N/A	1	按位解析见表 3.3
	10113							
10	10114	2	故障 FLAG2	RO	U32	N/A	1	
	10115							
11	10120	2	故障 FLAG3	RO	U32	N/A	1	
	10121							
12	10994	2	A 相电表功率	RO	I32	kW	1000	
	10995							
13	10996	2	B 相电表功率	RO	I32	kW	1000	
	10997							
14	10998	2	C 相电表功率	RO	I32	kW	1000	
	10999							
15	11000	2	三相电表总功率	RO	I32	kW	1000	
	11001							
16	11002	2	电表总卖电量	RO	U32	kWh	100	
	11003							

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
17	11004	2	电表总买电量	RO	U32	kWh	100	
	11005							
18	11006	1	电网 AB 线电压	RO	U16	V	10	
19	11007	1	电网 BC 线电压	RO	U16	V	10	
20	11008	1	电网 CA 线电压	RO	U16	V	10	
21	11009	1	电网 A 相电压	RO	U16	V	10	
22	11010	1	电网 A 相电流	RO	U16	A	10	
23	11011	1	电网 B 相电压	RO	U16	V	10	
24	11012	1	电网 B 相电流	RO	U16	A	10	
25	11013	1	电网 C 相电压	RO	U16	V	10	
26	11014	1	电网 C 相电流	RO	U16	A	10	
27	11015	1	电网频率	RO	U16	Hz	100	
28	11016	2	P_AC	RO	I32	kW	1000	
	11017							
29	11018	2	当日发电量	RO	U32	kWh	10	
	11019							
30	11020	2	总发电量	RO	U32	kWh	10	
	11021							
31	11022	2	总发电时间	RO	U32	H	1	
	11023							
32	11028	2	PV 输入总功率	RO	U32	kW	1000	
	11029							
33	11032	1	温度 1	RO	I16	℃	10	
34	11033	1	温度 2	RO	I16	℃	10	
35	11034	1	温度 3	RO	I16	℃	10	
36	11035	1	温度 4	RO	I16	℃	10	
37	11038	1	PV1 电压	RO	U16	V	10	
38	11039	1	PV1 电流	RO	U16	A	10	
39	11040	1	PV2 电压	RO	U16	V	10	
40	11041	1	PV2 电流	RO	U16	A	10	
41	11062	2	PV1 输入功率	RO	U32	kW	1000	
	11063							
42	11064	2	PV2 输入功率	RO	U32	kW	1000	
	11065							
43	18000	2	ARM 故障 FLAG1	RO	U32	N/A	1	按位解析见表 3.3
	18001							

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
	……							
44	30200	1	Backup_A_V	RO	U16	V	10	AC 电压
45	30201	1	Backup_A_I	RO	U16	A	10	AC 电流
46	30202	1	Backup_A_F	RO	U16	Hz	100	频率
47	30204	2	Backup_A_P	RO	I32	kW	1000	AC 有功功率
	30205							
48	30210	1	Backup_B_V	RO	U16	V	10	AC 电压
49	30211	1	Backup_B_I	RO	U16	A	10	AC 电流
50	30212	1	Backup_B_F	RO	U16	Hz	100	频率
51	30214	2	Backup_B_P	RO	I32	kW	1000	AC 有功功率
	30215							
52	30220	1	Backup_C_V	RO	U16	V	10	AC 电压
53	30221	1	Backup_C_I	RO	U16	A	10	AC 电流
54	30222	1	Backup_C_F	RO	U16	Hz	100	频率
55	30224	2	Backup_C_P	RO	I32	kW	1000	AC 有功功率
	30225							
56	30230	2	Total_Backup_P	RO	I32	kW	1000	AC 有功功率
	30231							
57	30236	2	Invt_A_P	RO	I32	kW	1000	A 相有功功率
	30237							
58	30242	2	Invt_B_P	RO	I32	kW	1000	B 相有功功率
	30243							
59	30248	2	Invt_C_P	RO	I32	kW	1000	C 相有功功率
	30249							
60	30254	1	Battery_V	RO	U16	V	10	DC 电压
61	30255	1	Battery_I	RO	I16	A	10	DC 电流
62	30256	1	Battery_Mode	RO	U16	N/A	1	0:discharge;1:charge
63	30258	2	Battery_P	RO	I32	kW	1000	电池功率
	30259							
64	31000	1	日卖电量	RO	U16	kWh	10	
65	31001	1	日买电量	RO	U16	kWh	10	
66	31002	1	日 Backup 负载电量	RO	U16	kWh	10	
67	31003	1	日电池充电量	RO	U16	kWh	10	
68	31004	1	日电池放电量	RO	U16	kWh	10	
69	31005	1	PV 日发电量	RO	U16	kWh	10	
70	31006	1	日负载用电量	RO	U16	kWh	10	

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
71	31008	1	逆变器日用电量	RO	U16	kWh	10	
72	31102	2	总卖电量	RO	U32	kWh	10	
	31103							
73	31104	2	总买电量	RO	U32	kWh	10	
	31105							
74	31106	2	总 Backup 负载电量	RO	U32	kWh	10	
	31107							
75	31108	2	总电池充电量	RO	U32	kWh	10	
	31109							
76	31110	2	总电池放电量	RO	U32	kWh	10	
	31111							
77	31112	2	PV 总发电量	RO	U32	kWh	10	
	31113							
78	31114	2	总负载用电量	RO	U32	kWh	10	
	31115							
79	31118	2	逆变器总用电量	RO	U32	kWh	10	
	31119							
	...							
80	32000	1	电池类型编码	RO	U16	N/A	1	
81	32001	1	Battery strings	RO	U16	N/A	1	
82	32002	1	Battery protocol	RO	U16	N/A	1	
83	32003	1	Software Version	RO	U16	N/A	1	
84	32004	1	Hardware Version	RO	U16	N/A	1	
85	32005	1	BMS Charge Imax	RO	U16	A	10	
86	32006	1	BMS Discharge Imax	RO	U16	A	10	
87	33000	1	SOC	RO	U16	%	100	
88	33001	1	SOH	RO	U16	%	100	
89	33002	1	BMS Status	RO	U16	N/A	1	
90	33003	1	BMS Pack Temperature	RO	U16	℃	10	
91	33008	1	Max Cell Temperature ID	RO	U16	N/A	1	
92	33009	1	Max Cell Temperature	RO	U16	℃	10	
93	33010	1	Min Cell Temperature ID	RO	U16	N/A	1	
94	33011	1	Min Cell Temperature	RO	U16	℃	10	
95	33012	1	Max Cell Voltage ID	RO	U16	N/A	1	
96	33013	1	Max Cell Voltage	RO	U16	V	1000	
97	33014	1	Min Cell Voltage ID	RO	U16	N/A	1	

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
98	33015	1	Min Cell Voltage	RO	U16	V	1000	
99	33016	2	BMS ERROR CODE	RO	U32	N/A	1	
	33017							
100	33018	2	BMS WARN CODE	RO	U32	N/A	1	
	33019							
101	33020	1	Charge Cutoff Voltage	RO	U16	N/A	10	
102	33021	1	Charge Current Limit	RO	U16	N/A	10	
103	33022	1	Discharge Cutoff Voltage	RO	U16	N/A	10	
104	33023	1	Discharge Current Limit	RO	U16	N/A	10	

表 1.1.2 机种信息

机种信息 (10008 高字节)		三相双路 储能逆变器	单相 储能逆变器	三相四路 储能逆变器 25-50K
		30	31	32
额定信息 (10008 低字节)	0	MHT-4K-25	MHS-3K-30D	MHT-25K-100
	1	MHT-5K-25	MHS-3.6K-30D	MHT-30K-100
	2	MHT-6K-25	MHS-4.2K-30D	MHT-36K-100
	3	MHT-8K-25	MHS-4.6K-30D	MHT-40K-100
	4	MHT-10K-25	MHS-5K-30D	MHT-50K-100
	5	MHT-12K-25	MHS-6K-30D	N/A
	6	MHT-10K-40	MHS-7K-30D	N/A
	7	MHT-12K-40	MHS-8K-30D	N/A
	8	MHT-15K-40	MHS-3K-30S	N/A
	9	MHT-20K-40	MHS-3.6K-30S	N/A
机种信息 (10008 高字节)		三相 AC 耦合 储能逆变器	单相 AC 耦合储能逆变器	三相 AC 耦合 储能逆变器
		40	41	42
额定信息 (10008 低字节)	0	MRT-4K-25	MRS-3K-30	MRT-25K-100
	1	MRT-5K-25	MRS-3.6K-30	MRT-30K-100
	2	MRT-6K-25	MRS-4.2K-30	MRT-36K-100
	3	MRT-8K-25	MRS-4.6K-30	MRT-40K-100
	4	MRT-10K-25	MRS-5K-30	MRT-50K-100
	5	MRT-12K-25	MRS-6K-30	N/A
	6	MRT-10K-40	MRS-7K-30	N/A
	7	MRT-12K-40	MRS-8K-30	N/A
	8	MRT-15K-40	N/A	N/A

	9	MRT-20K-40	N/A	N/A

表 1.1.3 故障解析

故障序号	寄存器地址	位	16 进制	10 进制	故障名称	中文显示	英文显示
1	10112 (故障 FLAG1)	BIT0	0x00000001	1	电网丢失	电网丢失	Mains Lost
2		BIT1	0x00000002	2	电网电压异常	电网电压异常	Grid Voltage Fault
3		BIT2	0x00000004	4	电网频率异常	电网频率异常	Grid Frequency Fault
4		BIT3	0x00000008	8	直流分量超限	直流分量超限	DCI Fault
5		BIT4	0x00000010	16	绝缘阻抗超限	绝缘阻抗超限	ISO Over Limitation
6		BIT5	0x00000020	32	漏电流超限	漏电流超限	GFCI Fault
7		BIT6	0x00000040	64	输入电压超限	输入电压超限	PV Over Voltage
8		BIT7	0x00000080	128	母线电压超限	母线电压超限	Bus Voltage Fault
9		BIT8	0x00000100	256	设备温度超限	设备温度超限	Inverter Over Temperature
1	10114 (故障 FLAG2)	BIT1	0x00000002	2	SPI 通讯故障	内部通讯故障二	SPI Fault
2		BIT2	0x00000004	4	E2 故障	存储器一故障	E2 Fault
3		BIT3	0x00000008	8	GFCI 传感器故障	漏电流传感器故障	GFCI Device Fault
4		BIT4	0x00000010	16	AC 电流传感器故障	输出电流传感器故障	AC Transducer Fault
5		BIT5	0x00000020	32	Relay 故障	继电器故障	Relay Check Fail
6		BIT6	0x00000040	64	内部风扇故障	内部风扇故障	Internal Fan Fault
7		BIT7	0x00000080	128	外部风扇故障	外部风扇故障	External Fan Fault

故障序号	寄存器地址	位	16 进制	10 进制	故障名称	中文显示	英文显示
	10120 (故障 FLAG3)	BIT0	0x00000001	1	母线硬件故障	母线硬件故障	Bus Hardware Fault
		BIT1	0x00000002	2	直流能量不足	直流能量不足	PV Power Low
		BIT2	0x00000004	4	电池电压故障	电池电压故障	Batt.Voltage Fault
		BIT3	0x00000008	8	备用电压异常	备用电压异常	BAK Voltage Fault
		BIT4	0x00000010	16	母线电压低	母线电压低	Bus Voltage Lower
		BIT5	0x00000020	32	硬件故障	硬件故障	Sys Hardware Fault
		BIT6	0x00000040	64	负载功率超限	负载功率超限	BAK Over Power
		BIT7	0x00000080	128	逆变电压超限	逆变电压超限	Inverter Over Voltage
		BIT8	0x00000100	256	逆变频率超限	逆变频率超限	Inverter Over Freq
		BIT9	0x00000200	512	逆变电流超限	逆变电流超限	Inverter Over Current
		BIT10	0x00000400	1024	电网相序异常	电网相序异常	Phase Order Err
1	18000 (ARM 故障 FLAG1)	BIT0	0x00000001	1	SCI 通讯故障	内部通讯故障一	SCI Fault
2		BIT1	0x00000002	2	Flash 故障	存储器二故障	FLASH Fault
3		BIT2	0x00000004	4	Meter 通讯异常	电表通讯异常	Meter Comm Fault

表 1.1.4 Solinteg 逆变器 RW 寄存器表

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
1	20000	1	设备 RTC 时间（连续写入）	RW	U16	N/A	1	高字节年[19-99] 低字节月[1-12]

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
2	20001	1				N/A	1	高字节日[1-31] 低字节时[0-23]
3	20002	1				N/A	1	高字节分[0-59] 低字节秒[0-59]
4	25000	1	安规代码	RW	U16	N/A	1	具体解析，见表 3.10
5	25015	1	过载方式设置	RW	1	N/A	1	0：额定（Rated） 1：过载（OverLoad1.x 倍过载） 2：限载(Limit)
6	25100	1	并网上行功率设置开关	RW	U16	N/A	1	0:关闭；1:打开
7	25103	1	并网上行功率百分比设置	RW	U16	N/A	1000	[0.0%-100.0%]
8	25104	1	电表通信状态	WO	U16	N/A	1	0:电表异常 1:电表正常
9	25105	2	电表 A 相功率	WO	I32	W	1	
10	25107	2	电表 B 相功率	WO	I32	W	1	
11	25109	2	电表 C 相功率	WO	I32	W	1	
12	25118	1	无功限值百分比	RW	I16	N/A	1000	[-600,+600] 精确到 0.1%
13	25120	1	PF 设置	RW	I16	N/A	1000	(-1000,-800]U[800,1000]
14	25121	1	无功控制模式	RW	U16	N/A	1	0:OFF 1: PF 2: Qt 3:Q(P) 4:Q(U)
	…							
15	28000	1	欠压恢复限值	RW	U16	V	10	550 - 2300
16	28001	1	过压恢复限值	RW	U16	V	10	2300-3000
17	28002	1	欠频恢复限值	RW	U16	Hz	100	4500-6500
18	28003	1	过频恢复限值	RW	U16	Hz	100	4500-6500
19	28004	1	一级欠压保护限值	RW	U16	V	10	550 - 2300
20	28005	1	一级欠压保护时间	RW	U16	Prd	1	1-50000
21	28006	1	一级过压保护限值	RW	U16	V	10	2300-3000
22	28007	1	一级过压保护时间	RW	U16	Prd	1	1-50000
23	28012	1	一级欠频保护限值	RW	U16	Hz	100	4500-6500
24	28013	1	一级欠频保护时间	RW	U16	Prd	1	1-50000
25	28014	1	一级过频保护限值	RW	U16	Hz	100	4500-6500
26	28015	1	一级过频保护时间	RW	U16	Prd	1	1-50000

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
27	28101	1	10 分钟过压开关	RW	U16	N/A	1	0:关闭；1:打开
28	28102	1	10 分钟过压阈值	RW	U16	V	10	2300-3000
	…							
29	50000	1	储能逆变器工作模式设置	RW	U16	N/A	1	具体解析，见表 3.6
30	50001	1	允许并离网切换开关	RW	U16	N/A	1	0:关闭；1:打开
31	50004	1	离网电压设置	RW	U16	V	10	
32	50005	1	离网频率设置	RW	U16	Hz	100	[45.00-65.00]Hz
33	50006	1	并网不平衡输出开关	RW	U16	N/A	1	0:关闭；1:打开
34	50007	1	用电过载补偿开关	RW	U16	N/A	1	0:关闭；1:打开
35	50009	1	市电最大容量设置	RW	U16	kVA	10	
36	50010	1	并机主从标志	RW	U16	N/A	1	0:单机独立运行(默认) (Indepent) 1:并机 从机(Slave) 2:并机 主机 (Master)
37	50011	1	N_PE 检测开关	RW	U16	N/A	1	0:关闭；1:打开
	…							
38	50202	1	AC 功率调度模式设置	RW	U16	N/A	1	0:关闭 1:总功率调度，寄存器地址 50203 2:三相功率独立调度，寄存器地址 50204-50206
39	50203	1	总功率调度设置	RW	I16	kW	100	总功率调度设置
40	50204	1	A 相功率调度设置	RW	I16	kW	100	A 相功率调度设置
41	50205	1	B 相功率调度设置	RW	I16	kW	100	B 相功率调度设置
42	50206	1	C 相功率调度设置	RW	I16	kW	100	C 相功率调度设置
43	50207	1	电池功率调度设置	RW	I16	kW	100	
44	50208	1	AC 功率上限设置	RW	I16	kW	100	
45	50209	1	AC 功率下限设置	RW	I16	kW	100	
46	50210	1	功率优先级	RW	U16	NA	1	0：PV 优先 1：电池优先
47	50211	1	PV 功率调度设置	RW	U16	kW	100	
	…							
48	52500	1	电池配置	RW	U16	N/A	1	见表 3.7
49	52501	1	电池协议配置	RW	U16	N/A	1	
50	52502	1	并网 SOC 保护	RW	U16	N/A	1	0:关闭，1:打开
51	52503	1	并网放电截至 SOC	RW	U16	N/A	1000	[0.0%-100.0%]
52	52504	1	离网 SOC 保护	RW	U16	N/A	1	0:关闭，1:打开

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
53	52505	1	离网放电截至 SOC	RW	U16	N/A	1000	[0.0%-100.0%]
	…							
54	53006	1	周期使能标志	RW	U16	N/A	1	bit0- bit5 对应 period1- period6, bit7-bit15 保留; 0 表示 disable 1 表示 enable
55	53007	1	充放电选择	RW	U16	N/A	1	Period1: 0:NONE 1:charge 2:discharge
56	53008	1	充电模式选择		U16	N/A	1	Period1: 0:PV 1:PV+GRID
57	53009	1	rsved		U16	N/A	1	Period1: 保留，填充 0xFF
58	53010	1	功率限制		U16	N/A	1000	Period1: [0.0-100.0%]
59	53011	1	rsved		U16	N/A	1	Period1: 保留，填充 0xFF
60	53012	1	开始时间		U16	N/A	1	Period1: 高 8 位(时):[0,23] 低 8 位(分):[0,59]
61	53013	1	结束时间		U16	N/A	1	
62	53014	1	充放电选择	RW	U16	N/A	1	Period2 备注同 Period1
63	53015	1	充电模式选择		U16	N/A	1	
64	53016	1	rsved		U16	N/A	1	
65	53017	1	功率限制		U16	N/A	1000	
66	53018	1	rsved		U16	N/A	1	
67	53019	1	开始时间		U16	N/A	1	
68	53020	1	结束时间		U16	N/A	1	
69	53021	1	充放电选择	RW	U16	N/A	1	Period3 备注同 Period1
70	53022	1	充电模式选择		U16	N/A	1	
71	53023	1	rsved		U16	N/A	1	
72	53024	1	功率限制		U16	N/A	1000	
73	53025	1	rsved		U16	N/A	1	
74	53026	1	开始时间		U16	N/A	1	

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
75	53027	1	结束时间		U16	N/A	1	
76	53028	1	充放电选择	RW	U16	N/A	1	Period4 备注同 Period1
77	53029	1	充电模式选择		U16	N/A	1	
78	53030	1	rsved		U16	N/A	1	
79	53031	1	功率限制		U16	N/A	1000	
80	53032	1	rsved		U16	N/A	1	
81	53033	1	开始时间		U16	N/A	1	
82	53034	1	结束时间		U16	N/A	1	
83	53035	1	充放电选择	RW	U16	N/A	1	Period5 备注同 Period1
84	53036	1	充电模式选择		U16	N/A	1	
85	53037	1	rsved		U16	N/A	1	
86	53038	1	功率限制		U16	N/A	1000	
87	53039	1	rsved		U16	N/A	1	
88	53040	1	开始时间		U16	N/A	1	
89	53041	1	结束时间		U16	N/A	1	
90	53042	1	充放电选择	RW	U16	N/A	1	Period6 备注同 Period1
91	53043	1	充电模式选择		U16	N/A	1	
92	53044	1	rsved		U16	N/A	1	
93	53045	1	功率限制		U16	N/A	1000	
94	53046	1	rsved		U16	N/A	1	
95	53047	1	开始时间		U16	N/A	1	
96	53048	1	结束时间		U16	N/A	1	
	…							
97	53500	8	BMSVersion	WO	STR	N/A	1	仅用于 BMS 接入 EMS
98	53508	1	BMS Status		U16	N/A	1	见表 3.8 仅用于 BMS 接入 EMS
99	53509	2	BMS ErrorCode		U32	N/A	1	见表 3.9 仅用于 BMS 接入 EMS
100	53511	2	BMS ProtectionCode		U32	N/A	1	
101	53513	2	BMS WarnCode		U32	N/A	1	
102	53515	1	BMSChargeVoltLimit		U16	V	10	仅用于 BMS 接入 EMS
103	53516	1	BMSChargeCurrMax		U16	A	10	
104	53517	1	BMSDishargeVoltLimit		U16	V	10	仅用于 BMS 接入 EMS
105	53518	1	BMSDishargeCurrMax		U16	A	10	
106	53519	1	BMSBatSOC		U16	%	100	
107	53520	1	BMSBatSOH		U16	%	100	
108	53521	1	BMSBatVoltage		U16	V	10	

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
109	53522	1	BMSBatCurrent		I16	A	10	
110	53523	1	BMSBatTemp		I16	℃	10	

表 1.1.5 Solinteg 逆变器 WO 寄存器表

序号	地址	字数	数据描述	读写	类型	单位	增益	备注
1	50200	1	开启离网运行指令	WO	U16	N/A	1	0:关闭；1:打开
2	50201	1	清除离网过载保护标志	WO	U16	N/A	1	写 1，清除

表 1.1.6 逆变器工作模式

序号	储能机工作模式编码		英文名称	中文名称	说明
	50000 高 8 位	50000 低 8 位			
1	01	01	General Mode	通用模式	
2		02	Economic Mode	经济模式	
3		03	UPS Mode	UPS 模式	
4	02	N/A	Off Grid Mode	离网模式	
5	03	01	EMS_ACCtrlMode	EMS 控制交流输出功率调度模式	寄存器地址 50202-50206 有效
6		02	EMS_GeneralMode	EMS 控制通用模式	
7		03	EMS_BattCtrlMode	EMS 控制 Battery 充放电模式	寄存器地址 50207-50211 有效
8		04	EMS_OffGridMode	EMS 控制离网模式	

表 1.1.7 电池配置(52500)

电池型号配置(52500)		电池型号（协议）配置(52501)		说明
品牌		显示名称		/
1	Solinteg	0	N/A	
		1	N/A	
		2	EBS-5150	
2	EMS	0	EMS_HV	仅用于 BMS 接入 EMS
3	Default	0	No Battery	
		1	Default HV_1	
10	Wattsonic Li-HV	0	WattLi_HV	
11	AOBOET	0	Aobo_ET	

12	DYNESS	0	Dyness	
13	Pylon	0	Pylon_HV	
14	Soluna	0	Soluna_HV	
16	WECO	0	WeCo_HV	
18	Jingkong	0	Mint-JKE	

表 1.1.8 BMS 状态(53508)

寄存器地址 (53508)	位	功能	说明
高八位 BMS 控制状态	Bit15	Rsved	
	Bit14		
	Bit13		
	Bit12		
	Bit11	强充请求 ForceCharge	1:请求强充（充电允许 Bit10 必须置 1） 0:无效值（Null）
	Bit10	充电允许	1:允许充电 0:禁止充电
	Bit9	离网放电允许	1:允许放电 0:禁止放电
	Bit8	并网放电允许	1:允许放电 0:禁止放电
低八位 BMS 运行状态	Bit0~Bit7	0:休眠 1:充电 2:放电 3:搁置 4:故障	

表 1.1.9 BMS 故障处理

寄存器地址	位	16 进制	10 进制	故障名称	说明
53509 (BMS Error Code)	BIT0	0x00000001	1	内部通讯故障	
	BIT1	0x00000002	2	电压传感器故障	
	BIT2	0x00000004	4	温度传感器故障	
	BIT3	0x00000008	8	Relay 故障	
	BIT4	0x00000010	16	电芯损坏故障	
53511 (BMS Protection Code)	BIT0	0x00000001	1	电池单体低压保护	
	BIT1	0x00000002	2	电池单体高压 保护	
	BIT2	0x00000004	4	电池组放电低压保护	
	BIT3	0x00000008	8	电池组充电高压保护	
	BIT4	0x00000010	16	充电低温保护	
	BIT5	0x00000020	32	充电高温保护	
	BIT6	0x00000040	64	放电低温保护	
	BIT7	0x00000080	128	放电高温保护	
	BIT8	0x00000100	256	电池组充电过流保护	
	BIT9	0x00000200	512	电池组放电过流保护	

寄存器地址	位	16 进制	10 进制	故障名称	说明
	BIT10	0x00000400	1024	电池模块欠压保护	
	BIT11	0x00000800	2048	电池模块过压保护	
	BIT12	0x00001000	4096	端子温度高保护	
	BIT13	0x00002000	8192	环境温度低保护	
	BIT14	0x00004000	16384	环境温度高保护	
	BIT15	0x00008000	32768	漏电流异常保护	
53513 (BMS Alarm Code)	BIT0	0x00000001	1	电池单体低压告警	
	BIT1	0x00000002	2	电池单体高压告警	
	BIT2	0x00000004	4	电池组放电低压告警	
	BIT3	0x00000008	8	电池组充电高压告警	
	BIT4	0x00000010	16	充电低温告警	
	BIT5	0x00000020	32	充电高温告警	
	BIT6	0x00000040	64	放电低温告警	
	BIT7	0x00000080	128	放电高温告警	
	BIT8	0x00000100	256	电池组充电过流告警	
	BIT9	0x00000200	512	电池组放电过流告警	
	BIT10	0x00000400	1024	电池模块低压告警	
	BIT11	0x00000800	2048	电池模块高压告警	
	BIT12	0x00001000	4096	端子温度过高告警	
	BIT13	0x00002000	8192	环境温度低告警	
	BIT14	0x00004000	16384	环境温度高告警	

表 1.1.10 国家安规编码解析表

编码	安规	备注
0~3	RSVED	禁止设置
4	自定义一	国内用户可自定义放宽保护条件，使逆变器可以并网
6	自定义二	国内用户可自定义放宽保护条件，使逆变器可以并网
10	50Hz Default	国外用户可自定义放宽保护条件，使逆变器可以并网
11	60Hz Default	国外用户可自定义放宽保护条件，使逆变器可以并网
12	VDE4105	德国安规，部分国家/地区也会采用
13	AS4777.2(A)	澳大利亚安规
14	AS4777.2(NZ)	新西兰安规
16	EN50549	欧洲安规
18	IEC61727(50Hz)	IEC 标准适用印度、东南亚、中东、非洲部分地区 50Hz 电网
19	IEC61727(60Hz)	IEC 标准适用印度、东南亚、中东、非洲部分地区 60Hz 电网
24	Italy	意大利

编码	安规	备注
25	Czech(A1)	捷克安规
26	Czech(A2)	捷克安规
29	EN50549(PL)	Poland 波兰安规
31	Belgium	比利时安规，C10/11
35	VDE0126	希腊 VDE0126-1-1
36	Italy(MV)	意大利 CEI 0-16
37	South Africa	南非 NRS 097-2-1
40	G98	英国
41	G99	英国
42	Austria	奥地利 TOR Erzeuger
46	AS4777.2(B)	澳大利亚
47	ES:UNE217002	西班牙
48	AS4777.2(C)	澳大利亚
49	ES:NTS631	西班牙

注：此表包含 Solinteg 储能机所有安规编码，每个机型所支持的安规以实际发行认证证书为准，如果机器不支持所设置的安规屏幕安规设置页面会提示“Please Set Grid Code”。

1.2. English

Table 1.2.1 Solinteg hybrid inverter RO registers table

No.	Addr.	Bytes	Description	R/W	Type	Unit	Accuracy	Note
1	10000	8	Device SN	RO	STR	N/A	1	Read bytes to string
	.....							
2	10008	1	Inverter Model	RO	U16	N/A	1	Please refer to table 3.2
3	10011	2	Firmware Version	RO	U32	N/A	1	Read bytes
	10012							
4	10100	1	Date: Y/M	RO	U16	N/A	1	Continuous read
5	10101	1	Time: D/H	RO	U16	N/A	1	
6	10102	1	Time: M/S	RO	U16	N/A	1	
7	10104	1	Safety Code	RO	U16	N/A	1	
8	10105	1	Inverter Working Status	RO	U16	N/A	1	0: Wait for grid connection 1: Self-checking 2: On-grid generating 3: Device fault 4: Firmware upgrade 5.Off-grid generating
9	10112	2	Fault FLAG1	RO	U32	N/A	1	Please refer to table 3.3
	10113							
10	10114	2	Fault FLAG2	RO	U32	N/A	1	
	10115							
11	10120	2	Fault FLAG3	RO	U32	N/A	1	
	10121							
12	10994	2	Pmeter on phase A	RO	I32	kW	1000	
	10995							
13	10996	2	Pmeter on phase B	RO	I32	kW	1000	
	10997							
14	10998	2	Pmeter on phase C	RO	I32	kW	1000	
	10999							
15	11000	2	Pmeter of three phases	RO	I32	kW	1000	
	11001							
16	11002	2	Total Grid-Injection Energy on Meter	RO	U32	kWh	100	
	11003							

No.	Addr.	Bytes	Description	R/W	Type	Unit	Accuracy	Note
17	11004	2	Total Purchasing Energy from Grid on Meter	RO	U32	kWh	100	
	11005							
18	11006	1	AB line voltage	RO	U16	V	10	
19	11007	1	BC line voltage	RO	U16	V	10	
20	11008	1	CA line voltage	RO	U16	V	10	
21	11009	1	Phase A Voltage	RO	U16	V	10	
22	11010	1	Phase A Current	RO	U16	A	10	
23	11011	1	Phase B Voltage	RO	U16	V	10	
24	11012	1	Phase B Current	RO	U16	A	10	
25	11013	1	Phase C Voltage	RO	U16	V	10	
26	11014	1	Phase C Current	RO	U16	A	10	
27	11015	1	Grid Frequency	RO	U16	Hz	100	
28	11016	2	P_AC	RO	I32	kW	1000	
	11017							
29	11018	2	Energy-today	RO	U32	kWh	10	
	11019							
30	11020	2	Energy-total	RO	U32	kWh	10	
	11021							
31	11022	2	Total Generation Hours	RO	U32	H	1	
	11023							
32	11028	2	Total PV Input Power	RO	U32	kW	1000	
	11029							
33	11032	1	Temp.1	RO	I16	℃	10	
34	11033	1	Temp.2	RO	I16	℃	10	
35	11034	1	Temp.3	RO	I16	℃	10	
36	11035	1	Temp.4	RO	I16	℃	10	
37	11038	1	PV1 Voltage	RO	U16	V	10	
38	11039	1	PV1 Current	RO	U16	A	10	
39	11040	1	PV2 Voltage	RO	U16	V	10	
40	11041	1	PV2 Current	RO	U16	A	10	
41	11062	2	PV1 Input Power	RO	U32	kW	1000	
	11063							
42	11064	2	PV2 Input Power	RO	U32	kW	1000	

No.	Addr.	Bytes	Description	R/W	Type	Unit	Accuracy	Note
	11065							
43	18000	2	ARM Fault FLAG1	RO	U32	N/A	1	Please refer to table 3.3
	18001							
	……							
44	30200	1	Backup_A_V	RO	U16	V	10	AC Voltage
45	30201	1	Backup_A_I	RO	U16	A	10	AC Current
46	30202	1	Backup_A_F	RO	U16	Hz	100	Frequency
47	30204	2	Backup_A_P	RO	I32	kW	1000	AC Active Power
	30205							
48	30210	1	Backup_B_V	RO	U16	V	10	AC Voltage
49	30211	1	Backup_B_I	RO	U16	A	10	AC Current
50	30212	1	Backup_B_F	RO	U16	Hz	100	Frequency
51	30214	2	Backup_B_P	RO	I32	kW	1000	AC Active Power
	30215							
52	30220	1	Backup_C_V	RO	U16	V	10	AC Voltage
53	30221	1	Backup_C_I	RO	U16	A	10	AC Current
54	30222	1	Backup_C_F	RO	U16	Hz	100	Frequency
55	30224	2	Backup_C_P	RO	I32	kW	1000	AC Active Power
	30225							
56	30230	2	Total_Backup_P	RO	I32	kW	1000	Total Active Power
	30231							
57	30236	2	Invt_A_P	RO	I32	kW	1000	Phase A Active Power
	30237							
58	30242	2	Invt_B_P	RO	I32	kW	1000	Phase B Active Power
	30243							
59	30248	2	Invt_C_P	RO	I32	kW	1000	Phase C Active Power
	30249							
60	30254	1	Battery_V	RO	U16	V	10	Battery Voltage
61	30255	1	Battery_I	RO	I16	A	10	Battery Voltage
62	30256	1	Battery_Mode	RO	U16	N/A	1	0:discharge;1:charge
63	30258	2	Battery_P	RO	I32	kW	1000	Battery Power
	30259							
64	31000	1	Daily Energy Injected to Grid	RO	U16	kWh	10	
65	31001	1	Daily Purchased Energy	RO	U16	kWh	10	

No.	Addr.	Bytes	Description	R/W	Type	Unit	Accuracy	Note
66	31002	1	Daily Energy Output on Backup Port	RO	U16	kWh	10	
67	31003	1	Daily Battery Charging Energy	RO	U16	kWh	10	
68	31004	1	Daily Battery Discharging Energy	RO	U16	kWh	10	
69	31005	1	Daily PV Generation	RO	U16	kWh	10	
70	31006	1	Daily Load Consumption	RO	U16	kWh	10	
71	31008	1	Daily Energy Purchased from Grid at Inverter Side	RO	U16	kWh	10	
72	31102	2	Total Energy Injected into Grid	RO	U32	kWh	10	
	31103							
73	31104	2	Total Purchased Energy from Grid	RO	U32	kWh	10	
	31105							
74	31106	2	Total Output Energy on Backup Port	RO	U32	kWh	10	
	31107							
75	31108	2	Total Battery Charging Energy	RO	U32	kWh	10	
	31109							
76	31110	2	Total Battery Discharging Energy	RO	U32	kWh	10	
	31111							
77	31112	2	Total PV Generation	RO	U32	kWh	10	
	31113							
78	31114	2	Total Load Consumption	RO	U32	kWh	10	
	31115							
79	31118	2	Total Energy Purchased from Grid at Inverter Side	RO	U32	kWh	10	
	31119							

No.	Addr.	Bytes	Description	R/W	Type	Unit	Accuracy	Note
	…							
80	32000	1	Battery Type Codes	RO	U16	N/A	1	
81	32001	1	Battery strings	RO	U16	N/A	1	
82	32002	1	Battery protocol	RO	U16	N/A	1	
83	32003	1	Software Version	RO	U16	N/A	1	
84	32004	1	Hardware Version	RO	U16	N/A	1	
85	32005	1	BMS Charge Imax	RO	U16	A	10	
86	32006	1	BMS Discharge Imax	RO	U16	A	10	
87	33000	1	SOC	RO	U16	%	100	
88	33001	1	SOH	RO	U16	%	100	
89	33002	1	BMS Status	RO	U16	N/A	1	
90	33003	1	BMS Pack Temperature	RO	U16	℃	10	
91	33008	1	Max Cell Temperature ID	RO	U16	N/A	1	
92	33009	1	Max Cell Temperature	RO	U16	℃	10	
93	33010	1	Min Cell Temperature ID	RO	U16	N/A	1	
94	33011	1	Min Cell Temperature	RO	U16	℃	10	
95	33012	1	Max Cell Voltage ID	RO	U16	N/A	1	
96	33013	1	Max Cell Voltage	RO	U16	V	1000	
97	33014	1	Min Cell Voltage ID	RO	U16	N/A	1	
98	33015	1	Min Cell Voltage	RO	U16	V	1000	
99	33016	2	BMS ERROR CODE	RO	U32	N/A	1	
	33017							
100	33018	2	BMS WARN CODE	RO	U32	N/A	1	
	33019							
101	33020	1	Charge Cutoff Voltage	RO	U16	N/A	10	
102	33021	1	Charge Current Limit	RO	U16	N/A	10	
103	33022	1	Discharge Cutoff Voltage	RO	U16	N/A	10	
104	33023	1	Discharge Current Limit	RO	U16	N/A	10	

Table 1.2.2 Device Model Info

Inverter Type (10008 high bit)		Three-phase Two MPPTs Hybrid	Single-phase hybrid	Three-phase Four MPPTS 25-50K
		30	31	32
Model info (10008 low bit)	0	MHT-4K-25	MHS-3K-30D	MHT-25K-100
	1	MHT-5K-25	MHS-3.6K-30D	MHT-30K-100
	2	MHT-6K-25	MHS-4.2K-30D	MHT-36K-100
	3	MHT-8K-25	MHS-4.6K-30D	MHT-40K-100
	4	MHT-10K-25	MHS-5K-30D	MHT-50K-100
	5	MHT-12K-25	MHS-6K-30D	N/A
	6	MHT-10K-40	MHS-7K-30D	N/A
	7	MHT-12K-40	MHS-8K-30D	N/A
	8	MHT-15K-40	MHS-3K-30S	N/A
	9	MHT-20K-40	MHS-3.6K-30S	N/A
Inverter Type (10008 high bit)		Three-phase AC-coupled inverter	Single-phase AC-coupled inverter	Three-phase AC-coupled inverter
		40	41	42
Model info (10008 low bit)	0	MRT-4K-25	MRS-3K-30	MRT-25K-100
	1	MRT-5K-25	MRS-3.6K-30	MRT-30K-100
	2	MRT-6K-25	MRS-4.2K-30	MRT-36K-100
	3	MRT-8K-25	MRS-4.6K-30	MRT-40K-100
	4	MRT-10K-25	MRS-5K-30	MRT-50K-100
	5	MRT-12K-25	MRS-6K-30	N/A
	6	MRT-10K-40	MRS-7K-30	N/A
	7	MRT-12K-40	MRS-8K-30	N/A
	8	MRT-15K-40	N/A	N/A
	9	MRT-20K-40	N/A	N/A

Table 1.2.3 Troubleshooting

Fault Code	Register Addr.	BIT	HEX	DEC	Fault Description	English Display
1	10112 (FAULT FLAG1)	BIT0	0x00000001	1	Mains Lost	Mains Lost
2		BIT1	0x00000002	2	Grid Voltage Fault	Grid Voltage Fault
3		BIT2	0x00000004	4	Grid Frequency Fault	Grid Frequency Fault
4		BIT3	0x00000008	8	DCI Fault	DCI Fault

Fault Code	Register Addr.	BIT	HEX	DEC	Fault Description	English Display
5		BIT4	0x00000010	16	ISO Over Limitation	ISO Over Limitation
6		BIT5	0x00000020	32	GFCI Fault	GFCI Fault
7		BIT6	0x00000040	64	PV Over Voltage	PV Over Voltage
8		BIT7	0x00000080	128	Bus Voltage Fault	Bus Voltage Fault
9		BIT8	0x00000100	256	Inverter Over Temperature	Inverter Over Temperature
1	10114 (FAULT FLAG2)	BIT1	0x00000002	2	SPI Fault	SPI Fault
2		BIT2	0x00000004	4	E2 Fault	E2 Fault
3		BIT3	0x00000008	8	GFCI Transducer Fault	GFCI Device Fault
4		BIT4	0x00000010	16	AC Transducer Fault	AC Transducer Fault
5		BIT5	0x00000020	32	Relay Fault	Relay Check Fail
6		BIT6	0x00000040	64	Internal Fan Fault	Internal Fan Fault
7		BIT7	0x00000080	128	External Fan Fault	External Fan Fault
	10120 (FAULT FLAG3)	BIT0	0x00000001	1	Bus Hardware Fault	Bus Hardware Fault
		BIT1	0x00000002	2	PV Power Low	PV Power Low
		BIT2	0x00000004	4	Batt.Voltage Fault	Batt.Voltage Fault
		BIT3	0x00000008	8	BAK Voltage Fault	BAK Voltage Fault
		BIT4	0x00000010	16	Bus Voltage Lower	Bus Voltage Lower
		BIT5	0x00000020	32	Sys Hardware Fault	Sys Hardware Fault
		BIT6	0x00000040	64	BAK Over Power	BAK Over Power
		BIT7	0x00000080	128	Inverter Over Voltage	Inverter Over Voltage
		BIT8	0x00000100	256	Inverter Over Freq	Inverter Over Freq
		BIT9	0x00000200	512	Inverter Over Current	Inverter Over Current

Fault Code	Register Addr.	BIT	HEX	DEC	Fault Description	English Display
		BIT10	0x00000400	1024	Phase Order Err	Phase Order Err
1	18000 (ARM FAULT FLAG1)	BIT0	0x00000001	1	SCI Fault	SCI Fault
2		BIT1	0x00000002	2	FLASH Fault	FLASH Fault
3		BIT2	0x00000004	4	Meter Comm Fault	Meter Comm Fault

Table 1.2.4 Solinteg Hybrid Inverter RW Registers Map

No.	Addr.	Bytes	Function Description	R/W	Type	Unit	Accuracy	Note
1	20000	1	Inverter RTC date and time (Continuous read in)	RW	U16	N/A	1	High Bit Year [19-99] Low Bit Month [1-12]
2	20001	1				N/A	1	High Bit Day [1-31] Low Bit Hour [0-23]
3	20002	1				N/A	1	High Bit Minute [0-59] Low Bit Second [0-59]
4	25000	1	Safety Code	RW	U16	N/A	1	Please refer to table 3.10
5	25015	1	Overload Method Setting	RW	1	N/A	1	0:Rated 1: 110% OverLoading 2: Limit
6	25100	1	Grid Injection Power Limit Switch	RW	U16	N/A	1	0:OFF; 1:ON
7	25103	1	Grid Injection Power Limit % Setting	RW	U16	N/A	1000	[0.0%-100.0%]
8	25104	1	Smart Meter COM. Status	WO	U16	N/A	1	0: Meter abnormal 1: Meter normal
9	25105	2	Pmeter on Phase A	WO	I32	W	1	
10	25107	2	Pmeter on Phase B	WO	I32	W	1	
11	25109	2	Pmeter on Phase C	WO	I32	W	1	

No.	Addr.	Bytes	Function Description	R/W	Type	Unit	Accuracy	Note
12	25118	1	Reactive power limit percentage	RW	I16	N/A	1000	[-600, +600] accuracy to 0.1%
13	25120	1	PF Setting	RW	I16	N/A	1000	(-1000, -800]U[800,1000]
14	25121	1	Reactive power Control Mode	RW	U16	N/A	1	0:OFF 1: PF 2: Qt 3:Q(P) 4:Q(U)
	…							
15	28000	1	Fault recovery voltage lower limit	RW	U16	V	10	550 - 2300
16	28001	1	Fault recovery voltage upper limit	RW	U16	V	10	2300-3000
17	28002	1	Fault recovery frequency lower limit	RW	U16	Hz	100	4500-6500
18	28003	1	Fault recovery frequency upper limit	RW	U16	Hz	100	4500-6500
19	28004	1	Level-1 undervoltage protection threshold	RW	U16	V	10	550 - 2300
20	28005	1	Level-1 undervoltage protection duration	RW	U16	Prd	1	1-50000
21	28006	1	Level-1 overvoltage protection threshold	RW	U16	V	10	2300-3000
22	28007	1	Level-1 overvoltage protection duration	RW	U16	Prd	1	1-50000

No.	Addr.	Bytes	Function Description	R/W	Type	Unit	Accuracy	Note
23	28012	1	Level-1 underfrequency protection threshold	RW	U16	Hz	100	4500-6500
24	28013	1	Level-1 underfrequency protection duration	RW	U16	Prd	1	1-50000
25	28014	1	Level-1 overfrequency protection threshold	RW	U16	Hz	100	4500-6500
26	28015	1	Level-1 overfrequency protection duration	RW	U16	Prd	1	1-50000
27	28101	1	10min overvoltage Switch	RW	U16	N/A	1	0: OFF; 1: ON
28	28102	1	10min overvoltage threshold	RW	U16	V	10	2300-3000
	…							
29	50000	1	Hybrid Inverter Working Mode Setting	RW	U16	N/A	1	Please refer to table 3.6
30	50001	1	Enable UPS Function Switch	RW	U16	N/A	1	0: OFF; 1: ON
31	50004	1	Off-grid Voltage Setting	RW	U16	V	10	
32	50005	1	Off-grid Frequency Setting	RW	U16	Hz	100	[45.00-65.00]Hz
33	50006	1	On-Grid Unbalanced Output Switch	RW	U16	N/A	1	0: OFF; 1: ON
34	50007	1	Peak Load Shifting Switch	RW	U16	N/A	1	0: OFF; 1: ON

No.	Addr.	Bytes	Function Description	R/W	Type	Unit	Accuracy	Note
35	50009	1	Max. Grid Power Value Setting	RW	U16	kVA	10	
36	50010	1	Parallel Master-Slave Sign	RW	U16	N/A	1	0: Independent Operating 1: Parallel (Slave) 2: Parallel (Master)
37	50011	1	N_PE Check Switch	RW	U16	N/A	1	0: OFF; 1: ON
	…							
38	50202	1	AC Power Scheduling Mode Setting	RW	U16	N/A	1	0: Off 1: Total Power Setting, Register: 50203 2: Power Setting on each Phase, Registers: 50204-50206
39	50203	1	Total AC Power Scheduling Setting	RW	I16	kW	100	Total AC Power Scheduling Setting
40	50204	1	Phase A Power Scheduling Setting	RW	I16	kW	100	Phase A Power Scheduling Setting
41	50205	1	Phase B Power Scheduling Setting	RW	I16	kW	100	Phase B Power Scheduling Setting
42	50206	1	Phase C Power Scheduling Setting	RW	I16	kW	100	Phase C Power Scheduling Setting
43	50207	1	Battery Power Scheduling Setting	RW	I16	kW	100	
44	50208	1	Max. AC Power Limit Setting	RW	I16	kW	100	
45	50209	1	Min. AC Power Limit Setting	RW	I16	kW	100	
46	50210	1	Priority of Power Output Setting	RW	U16	NA	1	0: PV Output Priority 1: Battery Output Priority
47	50211	1	PV Power Scheduling Setting	RW	U16	kW	100	
	…							
48	52500	1	Battery Configuration	RW	U16	N/A	1	Please refer to table 3.7
49	52501	1	Battery Protocol configuration	RW	U16	N/A	1	

No.	Addr.	Bytes	Function Description	R/W	Type	Unit	Accuracy	Note
50	52502	1	On-grid SOC Protection	RW	U16	N/A	1	0: OFF 1: ON
51	52503	1	On-grid Battery End SOC	RW	U16	N/A	1000	[0.0%-100.0%]
52	52504	1	Off-grid SOC Protection	RW	U16	N/A	1	0: OFF 1: ON
53	52505	1	Off-grid Battery End SOC	RW	U16	N/A	1000	[0.0%-100.0%]
	…							
54	53006	1	Period Enable Flag	RW	U16	N/A	1	bit0- bit5 stands for period1-period6, bit7-bit15 reserved; 0: disable 1: enable
55	53007	1	Charge/Discharge Setting	RW	U16	N/A	1	Period1: 0:NONE 1:charge 2:discharge
56	53008	1	Battery Charge By		U16	N/A	1	Period1: 0:PV 1:PV+GRID
57	53009	1	rsved		U16	N/A	1	Period1: Reserved: 0xFF
58	53010	1	Power Limit		U16	N/A	1000	Period1: [0.0-100.0%]
59	53011	1	rsved		U16	N/A	1	Period1: Reserved: 0xFF
60	53012	1	Start Time		U16	N/A	1	Period1: High 8bits(Hour):[0,23] Low 8bits(Mins):[0,59]
61	53013	1	Stop Time		U16	N/A	1	
62	53014	1	Charge/Discharge	RW	U16	N/A	1	Period2 Note Same as Period1
63	53015	1	Battery Charge By		U16	N/A	1	
64	53016	1	rsved		U16	N/A	1	
65	53017	1	Power Limit		U16	N/A	1000	
66	53018	1	rsved		U16	N/A	1	
67	53019	1	Start Time		U16	N/A	1	

No.	Addr.	Bytes	Function Description	R/W	Type	Unit	Accuracy	Note
68	53020	1	Stop Time		U16	N/A	1	
69	53021	1	Charge/Discharge	RW	U16	N/A	1	Period3 Note Same as Period1
70	53022	1	Battery Charge By		U16	N/A	1	
71	53023	1	rsved		U16	N/A	1	
72	53024	1	Power Limit		U16	N/A	1000	
73	53025	1	rsved		U16	N/A	1	
74	53026	1	Start Time		U16	N/A	1	
75	53027	1	Stop Time		U16	N/A	1	
76	53028	1	Charge/Discharge	RW	U16	N/A	1	Period4 Note Same as Period1
77	53029	1	Battery Charge By		U16	N/A	1	
78	53030	1	rsved		U16	N/A	1	
79	53031	1	Power Limit		U16	N/A	1000	
80	53032	1	rsved		U16	N/A	1	
81	53033	1	Start Time		U16	N/A	1	
82	53034	1	Stop Time		U16	N/A	1	
83	53035	1	Charge/Discharge	RW	U16	N/A	1	Period5 Note Same as Period1
84	53036	1	Battery Charge By		U16	N/A	1	
85	53037	1	rsved		U16	N/A	1	
86	53038	1	Power Limit		U16	N/A	1000	
87	53039	1	rsved		U16	N/A	1	
88	53040	1	Start Time		U16	N/A	1	
89	53041	1	Stop Time		U16	N/A	1	
90	53042	1	Charge/Discharge	RW	U16	N/A	1	Period6 Note Same as Period1
91	53043	1	Battery Charge By		U16	N/A	1	
92	53044	1	rsved		U16	N/A	1	
93	53045	1	Power Limit		U16	N/A	1000	
94	53046	1	rsved		U16	N/A	1	
95	53047	1	Start Time		U16	N/A	1	
96	53048	1	Stop Time		U16	N/A	1	
	…							
97	53500	8	BMSVersion	WO	STR	N/A	1	Only for BMS access to EMS
98	53508	1	BMS Status		U16	N/A	1	Please refer to Table 3.8 Only for BMS access to EMS
99	53509	2	BMS ErrorCode		U32	N/A	1	Please refer to Table 3.9 Only for BMS

No.	Addr.	Bytes	Function Description	R/W	Type	Unit	Accuracy	Note
100	53511	2	BMS ProtectionCode		U32	N/A	1	access to EMS
101	53513	2	BMS WarnCode		U32	N/A	1	
102	53515	1	BMSChargeVoltLimit		U16	V	10	Only for BMS access to EMS
103	53516	1	BMSChargeCurrMax		U16	A	10	
104	53517	1	BMSDishargeVoltLimit		U16	V	10	Only for BMS access to EMS
105	53518	1	BMSDishargeCurrMax		U16	A	10	
106	53519	1	BMSBatSOC		U16	%	100	
107	53520	1	BMSBatSOH		U16	%	100	
108	53521	1	BMSBatVoltage		U16	V	10	
109	53522	1	BMSBatCurrent		I16	A	10	
110	53523	1	BMSBatTemp		I16	℃	10	

Table 1.2.5 Solinteg Hybrid Inverter WO Registers Map

No.	Addr.	Bytes	Function Description	R/W	Type	Unit	Accuracy	Note
1	50200	1	Off-grid function Switch	WO	U16	N/A	1	0: OFF; 1: ON
2	50201	1	Clear Off-grid Over-loading Protection Flag	WO	U16	N/A	1	Write 1 to clear

Table 1.2.6 Hybrid Inverter Working Mode

No.	Hybrid Inverter Working Mode		English Display	Note
	50000 high 8bits	50000 low 8bits		
1	01	01	General Mode	
2		02	Economic Mode	
3		03	UPS Mode	
4	02	N/A	Off Grid Mode	
5	03	01	EMS_ACCtrlMode	Valid Registers: 50202-50206
6		02	EMS_GeneralMode	
7		03	EMS_BattCtrlMode	Valid Registers:50207-50211
8		04	EMS_OffGridMode	

Table 1.2.7 Battery Configuration (52500)

Battery Brand (52500)		Battery model（Protocol）Configuration(52501)		Description
Brand		Display		/
1	Solinteg	0	N/A	
		1	N/A	
		2	EBS-5150	
2	EMS	0	EMS_HV	Only for BMS access to EMS
3	Default	0	No Battery	
		1	Default HV_1	
10	Wattsonic Li-HV	0	WattLi_HV	
11	AOBOET	0	Aobo_ET	
12	DYNESS	0	Dyness	
13	Pylon	0	Pylon_HV	
14	Soluna	0	Soluna_HV	
16	WECO	0	WeCo_HV	
18	Jingkong	0	Mint-JKE	

Table 1.2.8 BMS Status (53508)

Register Addr. (53508)	Bits	Function	Description
High 8 bits BMS Control Status	Bit15	Rsved	
	Bit14		
	Bit13		
	Bit12		
	Bit11	Force Charge	1: Force Charge Command（Charge Command Bit10 must write 1） 0: Invalid (Null)
	Bit10	Charge Command	1: Enable 0: Disable
	Bit9	Off-grid Discharge Command	1: Enable 0: Disable
	Bit8	On-grid Discharge Command	1: Enable 0: Disable
Low 8bits BMS Running Status	Bit0~Bit7	0:Sleep 1:Charge 2:Discharge 3:Standby	

		4:Fault	

Table 1.2.9 BMS Troubleshooting

Register Addr.	Bits	Hex	Dec	Fault Description	Note
53509 (BMS Error Code)	BIT0	0x00000001	1	Internal COM Fault	
	BIT1	0x00000002	2	Voltage Sensor Fault	
	BIT2	0x00000004	4	Temperature Sensor Fault	
	BIT3	0x00000008	8	Relay Fault	
	BIT4	0x00000010	16	Cells Damage Fault	
53511 (BMS Protection Code)	BIT0	0x00000001	1	Cells Low Voltage Protection	
	BIT1	0x00000002	2	Cells High Voltage Protection	
	BIT2	0x00000004	4	Battery Module Discharge Low Voltage Protection	
	BIT3	0x00000008	8	Battery Module Charge Over Voltage Protection	
	BIT4	0x00000010	16	Charge Low Temperature Protection	
	BIT5	0x00000020	32	Charge High Temperature Protection	
	BIT6	0x00000040	64	Discharge Low Temperature Protection	
	BIT7	0x00000080	128	Discharge High Temperature Protection	
	BIT8	0x00000100	256	Battery Module Charge Over-current Protection	
	BIT9	0x00000200	512	Battery Module Discharge Over-current Protection	
	BIT10	0x00000400	1024	Battery Module Low Voltage Protection	
	BIT11	0x00000800	2048	Battery Module Over Voltage Protection	
	BIT12	0x00001000	4096	Power Terminal Over Temperature Protection	
	BIT13	0x00002000	8192	Ambient Low Temperature Protection	
	BIT14	0x00004000	16384	Ambient High Temperature Protection	

Register Addr.	Bits	Hex	Dec	Fault Description	Note
	BIT15	0x00008000	32768	Leakage Current Protection	
53513 (BMS Alarm Code)	BIT0	0x00000001	1	Cells Low Voltage Warning	
	BIT1	0x00000002	2	Cells High Voltage Warning	
	BIT2	0x00000004	4	Battery Module Discharge Low Voltage Warning	
	BIT3	0x00000008	8	Battery Module Charge Over Voltage Warning	
	BIT4	0x00000010	16	Charge Low Temperature Warning	
	BIT5	0x00000020	32	Charge High Temperature Warning	
	BIT6	0x00000040	64	Discharge Low Temperature Warning	
	BIT7	0x00000080	128	Discharge High Temperature Warning	
	BIT8	0x00000100	256	Battery Module Charge Over Current Warning	
	BIT9	0x00000200	512	Battery Module Discharge Over Current Warning	
	BIT10	0x00000400	1024	Battery Module Low Voltage Warning	
	BIT11	0x00000800	2048	Battery Module High Voltage Warning	
	BIT12	0x00001000	4096	Power Terminal Over Temperature Warning	
	BIT13	0x00002000	8192	Ambient Low Temperature Warning	
	BIT14	0x00004000	16384	Ambient High Temperature Warning	

Table 1.2.10 National Safety Code Description

No.	Safety Code	Note
0~3	RSVED	Disable Setting
4	Customized code 1	Domestic users can customize the extend of the protection limitation, so that the inverter can be connected to the grid

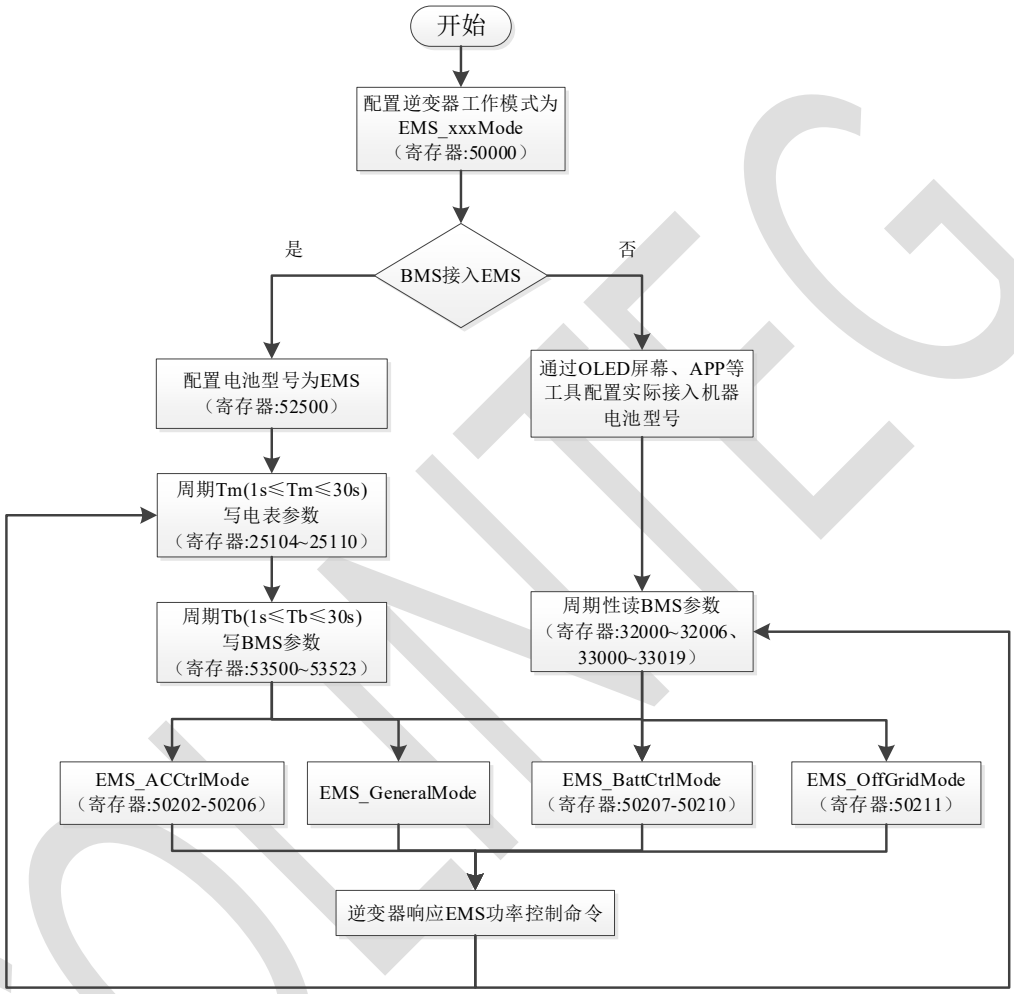
No.	Safety Code	Note
6	Customized code 2	Domestic users can customize the extend of the protection limitation, so that the inverter can be connected to the grid
10	50Hz Default	Overseas users can customize the extend of the protection limitation, so that the inverter can be connected to the grid
11	60Hz Default	Overseas users can customize the extend of the protection limitation, so that the inverter can be connected to the grid
12	VDE4105	German safety code, can be also used by some other countries/regions.
13	AS4777.2(A)	Australia safety code
14	AS4777.2(NZ)	New Zealand safety code
16	EN50549	European safety code
18	IEC61727(50Hz)	IEC standards apply to 50Hz power grids in India, Southeast Asia, the Middle East and parts of Africa
19	IEC61727(60Hz)	IEC standards apply to 60Hz power grids in India, Southeast Asia, the Middle East and parts of Africa
24	Italy	Italy safety code
25	Czech(A1)	Czech safety code
26	Czech(A2)	Czech safety code
29	EN50549(PL)	Poland safety code
31	Belgium	Belgium safety code，C10/11
35	VDE0126	Greece VDE0126-1-1
36	Italy(MV)	ItalyCEI 0-16
37	South Africa	South AfricaNRS 097-2-1
40	G98	England
41	G99	England
42	Austria	Austria TOR Erzeuger
46	AS4777.2(B)	Australia
47	ES:UNE217002	Spain
48	AS4777.2(C)	Australia
49	ES:NTS631	Spain

Note: This table contains all the safety codes of Solinteg energy storage inverter, the safety codes supported by each model are subject to the actual issuance of the certification certificate, if the inverter does not support the code, screen setting page will prompt "Please Set Grid Code"

2. EMS 应用 EMS Applications

2.1. 中文

EMS 接入控制流程图



注：当 BMS 接入 EMS 时，如果 EMS 未按照规定时间周期实时写入电表参数（寄存器：25104~25110）和 BMS 参数（53500~53523），则会触发机器保护或按照默认参数运行。

场景 1 ： AC 功率控制

EMS_ACCtrlMode						
AC 调度控制	寄存器地址					说明
	功率调度模式设置（50202）	总功率调度设置（50203）	A 相功率调度设置（50204）	B 相功率调度设置（50205）	C 相功率调度设置（50206）	
AC 总功率调度	1	Set Power	--	--	--	
	注：Set Power 为总功率（输入\输出）设置值 Pinv(1) = Set Power Set; PowerA = PowerB = PowerC = Set Power /3					
AC 三相功率独立调度	2	--	Set PowerA	Set PowerB	Set PowerC	
	注：Set PowerA、Set PowerB、Set PowerC 为 A\B\C 三相功率设置值 Pinv = Set PowerA+ Set PowerB+ Set PowerC					

场景 2：通用模式

EMS_GeneralMode						
控制模式	寄存器地址					说明
	--	--	--	--	--	
通用模式	注：自发自用 Pload[2] = Ppv[3] + Pbat[4] - Pmeter[5]					

场景 3：电池充放电控制

EMS_BattCtrlMode					
电池充放电控制模式	寄存器地址				说明： ● 当 Pbat<0 时表示的是对电池充电; ● 当 Pbat>0 时表示的是对电池放电; ● 当 Pinv<0 时表示的是逆变器从电网取电; ● 当 Pinv>0 时表示的是逆变器对电网发电; ● Set PupLimit 和 Set PlowerLimit 分别表示 Pinv 的限制上限和下限，用于控制逆变器对电网发电和取电限制 Set PupLimit >= Set PlowerLimit 根据逆变器功率平衡公式 Pinv = Pbat + Ppv 可知，当 Pbat 给定，根据 Pinv 的限制条件（Set PupLimit 和 Set PlowerLimit）和 Ppv 的优先级可以最终确定逆变器的工作逻辑以实现目标功能。
	电池功率调度设置（50207）	AC 功率上限设置（50208）	AC 功率下限设置（50209）	功率优先级（50210）	
电池充电	Set Pbat	Set PupLimit	Set PlowerLimit	0: PV 优先	
	例如: 参数设置：Set Pbat = -1000W; Set PupLimit = 10000W; Set PlowerLimit = -500W;优先级为 PV; 控制目标：电池充电 1000W，最大对电网放电不超过 10000W，最大从电网取电不超过 500W; 1) 假设 Ppv = 0W，电池的充电功率为 500W(Pbat = -500W)，逆变器从电网取电 500W（Pinv = -500W）； 2) 假设 Ppv = 200W，电池的充电功率为 700W(Pbat = -700W)，逆变器从电网取电 500W（Pinv = -500W）； 3) 假设 Ppv = 2000W，电池的充电功率为 1000W(Pbat = -1000W)，逆变器对电网放电 1000W （Pinv = 1000W）				
电池放电	Set Pbat	Set PupLimit	Set PlowerLimit	0: PV 优先	
	例如: 参数设置：Set Pbat = 1000W; Set PupLimit = 2000W; Set PlowerLimit = -10000W;优先级为 PV; 控制目标：电池放电 1000W，最大对电网放电不超过 2000W，最大从电网取电不超过 10000W; 1) 假设 Ppv = 0W，电池的放电功率为 1000W(Pbat = 1000W)，逆变器对电网放电 1000W（Pinv = 1000W）； 2) 假设 Ppv = 500W，电池的放电功率为 1000W(Pbat = 1000W)，逆变器对电网放电 1500W（Pinv = 1500W）； 3) 假设 Ppv = 1500W，电池的放电功率为 500W(Pbat = 500W)，逆变器对电网放电 2000W（Pinv = 2000W）；				
电池强制充电	Set Pbat	Set PupLimit	Set PlowerLimit	0: PV 优先	
	例如: 参数设置：Set Pbat = -1000W; Set PupLimit = 10000W; Set PlowerLimit = -500W;优先为 PV, 控制目标：电池充电 1000W，最大对电网放电不超过 10000W，解除电网取电功率限制机器强制 Set PlowerLimit = -Pn; 1) 假设 Ppv = 0W，电池的充电功率为 1000W(Pbat = -1000W)，逆变器从电网取电 1000W（Pinv = -1000W）； 2) 假设 Ppv = 200W，电池的充电功率为 1000W(Pbat = -1000W)，逆变器从电网取电 800W（Pinv = -800W）； 3) 假设 Ppv = 2000W，电池的充电功率为 1000W(Pbat = -1000W)，逆变器对电网放电 1000W（Pinv = 1000W）				

电池强制放电	Set Pbat	Set PupLimit	Set PlowerLimit	1: 电池优先	
	例如: 参数设置: Set Pbat = 1000; Set PupLimit = 2000; Set PlowerLimit = -10000;优先级为 Bat; 控制目标: 电池放电 1000W，最大对电网放电不超过 2000W，最大从电网取电不超过 10000W; 1) 假设 Ppv = 0W，电池的放电功率为 1000W(Pbat = 1000W)，逆变器对电网放电 1000W（Pinv = 1000W）； 2) 假设 Ppv = 500W，电池的放电功率为 1000W(Pbat = 1000W)，逆变器对电网放电 1500W（Pinv = 1500W）； 3) 假设 Ppv = 1500W（限制 Ppv 限制发电为 1000W，电池放电优先），电池的放电功率为 1000W(Pbat = 1000W)，逆变器对电网放电 2000W（Pinv = 2000W）；				

场景 4: 离网模式

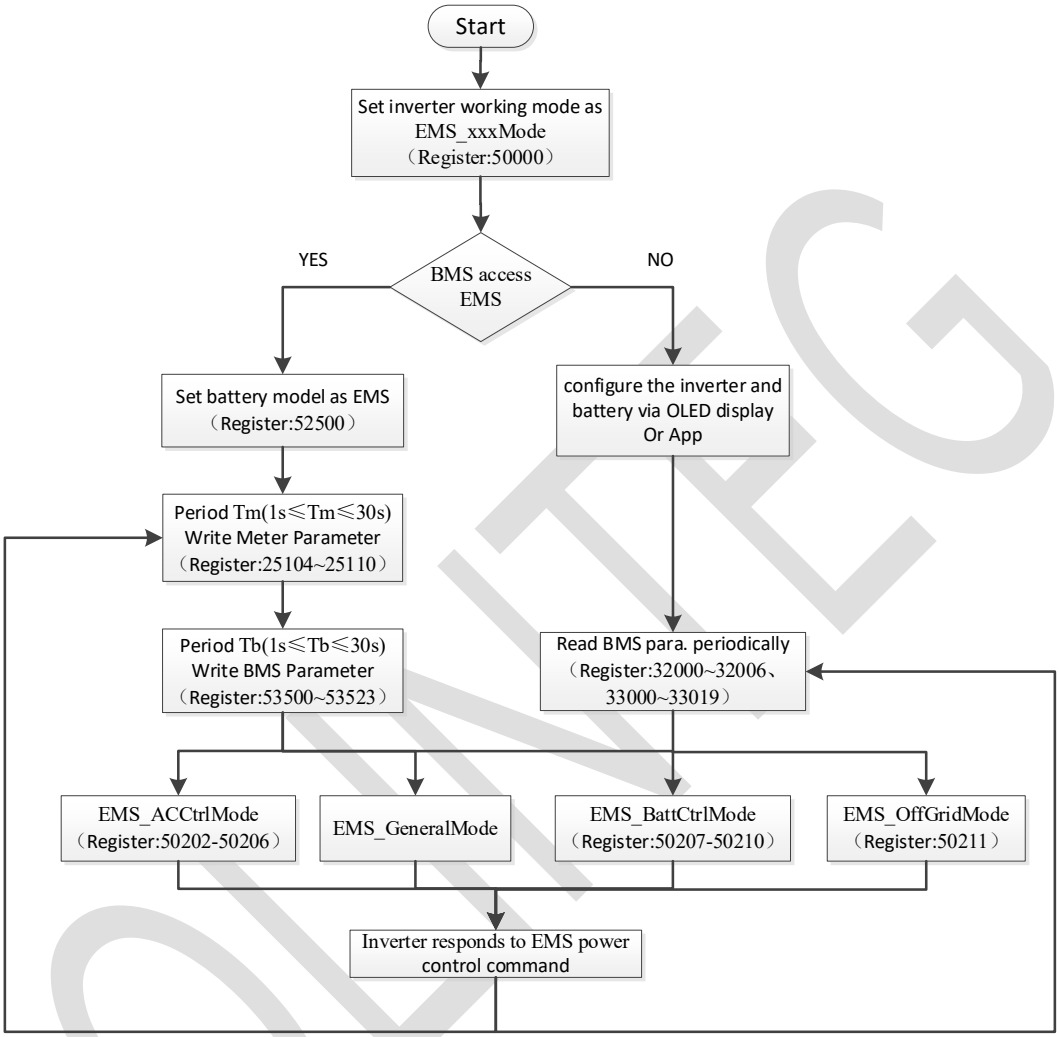
EMS_OffGridMode						
控制模式	寄存器地址					说明
	PV 功率调度设置（50211）	--	--	--	--	
	Set Ppv					
离网模式	Ppv = Set Ppv 注: $P_{backup}^{(a)} = P_{bat} + P_{pv}$					

注:

1) 储能逆变器 AC 功率
2) 总负载功率（包含网侧负载）
3) PV 输出功率
4) 电池充/放电功率
5) 买卖电功率
6) 备用负载功率

2.2. English

EMS Control Procedure



Note: When the smart meter and BMS access the EMS, if the EMS failed to write in the smart meter data (register: 25104~25110) and BMS data (53500~53523) in real-time according to the specified time period, it will trigger inverter protection or follow the default parameter operation.

Application 1：AC Power Control

EMS_ACCtrlMode						
AC Power Setting	Register Addr.					Note
	Power Scheduling Mode Setting (50202)	Total Power Scheduling Setting (50203)	Phase A Power Scheduling Setting (50204)	Phase B Power Scheduling Setting (50205)	Phase C Power Scheduling Setting (50206)	
AC Total Power Scheduling	1	Set Power	--	--	--	
	Note: Set Power is to set the total input/output power of inverter Pinv(1) = Set Power Set; PowerA = PowerB = PowerC = Set Power /3					
AC Three Phases Independent Scheduling	2	--	Set PowerA	Set PowerB	Set PowerC	
	Note: Set PowerA, Set PowerB, Set PowerC is to set PhaseA/B/C power independently, which shall follow the rule as below Pinv = Set PowerA+ Set PowerB+ Set PowerC					

Application 2：General Mode

EMS_GeneralMode						
Control Mode	Register Addr.					Note
	--	--	--	--	--	
General Mode	Note: For maximum PV Self-consumption, shall follow the rule as below: Pload(2) = Ppv(3) + Pbat(4) - Pmeter(5)					

Application 3：Battery Charge/Discharge Control

EMS_BattCtrlMode					
Battery Charge/Discharge	Register Addr.				
	Battery Power Scheduling Setting (50207)	AC Power UP Setting (50208)	AC Power Lower Setting (50209)	Power Supply Priority (50210)	
Battery Charge	Set Pbat	Set PupLimit	Set PlowerLimit	0: PV Supply with Priority	Note: ● Pbat<0, battery charging; ● Pbat>0, battery discharging; ● Pinv<0, purchasing power from grid; ● Pinv>0, power injection to grid; ● Set PupLimit is setting the UP limit of Pinv, Set PlowerLimit is setting the lower limit of Pinv, please make sure Set PupLimit >= Set PlowerLimit According to inverter power balance formula: Pinv = Pbat + Ppv, when Pbat is confirmed, as well as the Pinv limits set(Set PupLimit and Set PlowerLimit) and Ppv priority, EMS can confirm the inverter running logic with much flexibility.
	Eg: Parameter Setting: Set Pbat = -1000W; Set PupLimit = 10000W; Set PlowerLimit = -500W; PV supply with priority; Control Target: Battery Charge 1000W, Maximum Grid Injection: 10000W, Maximum Gird Purchasing: 500W; 1) E.g. Ppv = 0W, battery charge power is 500W(Pbat = -500W), Inverter Grid Purchasing 500W(Pinv =-500W); 2) E.g. Ppv = 200W, battery charge power is 700W(Pbat = -700W), Inverter Grid Purchasing is 500W(Pinv = -500W); 3) E.g. Ppv = 2000W, battery charge power is 1000W(Pbat = -1000W), Inverter Grid Injection Power is 1000W (Pinv = 1000W)				
Battery Discharge	Set Pbat	Set PupLimit	Set PlowerLimit	0: PV Supply with Priority	
	Eg: Parameter Setting: Set Pbat = 1000W; Set PupLimit = 2000W; Set PlowerLimit = -10000W; PV Supply with Priority Control Target: Battery Discharge: 1000W, Max. Grid Injection Power: 2000W, Max. Grid Purchasing Power: 10000W; 1) E.g. Ppv = 0W, Battery Discharge Power: 1000W(Pbat = 1000W), Inverter Grid Injection Power: 1000W(Pinv = 1000W) 2) E.g. Ppv = 500W, Battery Discharge Power: 1000W(Pbat = 1000W), Inverter Grid Injection Power: 1500W(Pinv = 1500W) 3) E.g. Ppv = 1500W, Battery Discharge Power: 500W(Pbat = 500W), Inverter Grid Injection Power 2000W(Pinv = 2000W);				
Battery Force Charge	Set Pbat	Set PupLimit	Set PlowerLimit	0: PV Supply with Priority	
	Eg. Parameter Setting: Set Pbat = -1000W; Set PupLimit = 10000W; Set PlowerLimit = -500W; PV Supply with Priority				

<table>
<tr><td></td><td colspan="4">Control Target: Battery Charge Power:1000W, Max. Grid Injection Power: 10000W, release inverter grid purchasing power limit and Set PlowerLimit = -Pn;
1) E.g. Ppv = 0W, battery charge power is 1000W(Pbat = -1000W), Inverter Grid Purchasing Power: 1000W(Pinv = -1000W);
2) E.g. Ppv = 200W, battery charge power is 1000W(Pbat = -1000W), Inverter Grid Purchasing Power: 800W(Pinv = -800W);
3) E.g. Ppv = 2000W, battery charge power is 1000W(Pbat = -1000W), Inverter Grid Injection Power:1000W(Pinv = 1000W)</td><td></td></tr>
<tr><td rowspan="2">Battery Force Discharge</td><td>Set Pbat</td><td>Set PupLimit</td><td>Set PlowerLimit</td><td>1: Battery Supply with Priority</td><td rowspan="2"></td></tr>
<tr><td colspan="4">Eg.
Parameter Setting: Set Pbat = 1000; Set PupLimit = 2000; Set PlowerLimit = -10000; Bat PV Supply with Priority;
Control Target: Battery Discharge Power:1000W, Max. Inverter Grid Injection Power: 2000W, Max. Grid Purchasing Power: 10000W;
1) E.g.Ppv=0W, Battery Discharge Power: 1000W(Pbat=1000W), Grid Injection Power:1000W(Pinv = 1000W);
2) E.g.Ppv=500W, Battery Discharge Power:1000W(Pbat=1000W), Grid Injection Power:1500W(Pinv =1500W);
3) E.g. Ppv =1500W(Limit Ppv<=1000W, battery supply with priority), Battery Discharge Power: 1000W(Pbat = 1000W), Grid Injection Power: 2000W(Pinv = 2000W);</td></tr>
</table>

Application 4: Off-grid Mode

<table>
<tr><td colspan="6">EMS_OffGridMode</td></tr>
<tr><td rowspan="3">Control Mode</td><td colspan="4">Register Addr.</td><td rowspan="2">Note</td></tr>
<tr><td>PV Power Scheduling Setting (50211)</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
<tr><td>Set Ppv</td><td></td><td></td><td></td><td></td><td rowspan="2"></td></tr>
<tr><td>Off-grid Mode</td><td colspan="4">Ppv = Set Ppv
Note: Pbackup(6) = Pbat + Ppv</td></tr>
</table>

Note:

1) Hybrid Inverter AC Power
2) Total Load Power (on-grid load + backup load)
3) PV Output Power
4) Battery Charge/Discharge Power
5) Gird Injection/Purchasing Power
6) Hybrid inverter backup loading Power