

Simplified Version

Third-Party EMS Protocol MODBUS_V1.1.1



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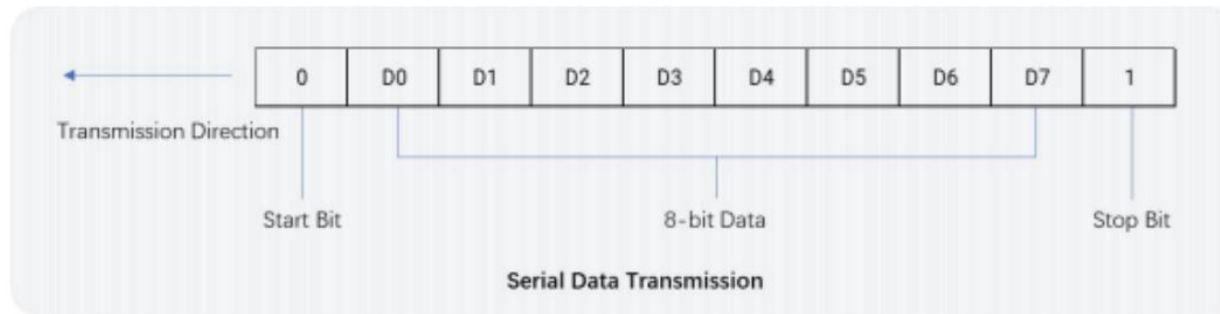
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This MODBUS RTU protocol applies to the communication between GoodWe hybrid inverters series and the monitoring device. The protocol can be used to read real-time operating data and fault status of the inverter, and to perform remote control.

1. Byte Format



A byte is of 8 binary digits working together with 1 start bit (0) and 1 stop bit (1) in transmission, 10 bits in total. As illustrated below, D0 is the least significant bit (LSB) and D7 is the most significant bit (MSB). Pass to the least significant bit first, then to the most significant bit. .

2. Communication Data Format

Data are exchanged in the form of word or double word :

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

3. Frame Format

3.1 Read the Content of Register (Function code: 03H)

3.1.1 Frame format from host device

No.	Code	Example	Description
1	Device Address	01H	The device's communication address (1-247 DEC)
2	03H	03H	Function code
3	MSB of First Register	00H	The address of first register
4	LSB of First Register	01H	
5	MSB of Register Number	00H	Register number
6	LSB of register Number	02H	
7	CRC16 LSB of Checksum	95H	CRC Checksum Data
8	CRC16 MSB of Checksum	CBH	Checksum method: No CRC Checksum

3.1.2 Frame format by device (normal data)

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

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

No.	Code	Description
1	Device Address	The device's communication address (1-247 DEC)
2	83H	Function code
3	02H	Error Code
4	CRC16 LSB of Checksum	CRC Checksum
5	CRC16 MSB of Checksum	

3.2 Set the Content of Register (Function code: 10H)

3.2.1 Frame format from host device

No.	Code	Example	Description
1	Device address	01H	The device's communication address (1-247 DEC)
2	10H	10H	Function code

No.	Code	Example	Description
3	MSB of First Register	00H	Address of register 0000H
4	LSB of First Register	00H	
5	MSB of Register Number	00H	Register number 01H
6	LSB of Register Number	01H	
7	Byte Number(N)	02H	Byte number of register 02H
8	MSB of Data	0AH	Data 0AF0H
9	LSB of Data	F0H	
10	CRC16 LSB of Checksum	A0H	CRC Checksum
11	CRC16 MSB of Checksum	B4H	

3.2.2 Frame format by device (write successful)

No.	Code	Example	Description
1	Device address	01H	The device's communication address (1-247 DEC)
2	10H	10H	Function code
3	MSB of First Register	00H	Address of register 0000H
4	LSB of First Register	00H	
5	MSB of Register Number	00H	Register number 01H
6	LSB of Register Number	01H	
7	CRC16 LSB of Checksum	01H	CRC Checksum
8	CRC16 MSB of Checksum	C9H	

3.2.3 Frame format by device (data error)

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

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

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

4. Baud Rate of Communication

9600bps

5. Device Address

The range of device address is 1 – 247 with 247 as default setting before delivery. Please set the address onsite via SEMS+ or inverter's LCD screen according to SOP.

6. Function Code

03H: read (Note: read of one or more consecutive addresses are supported)

10H: write (Note: RTC time should be written together)

7. CRC Checking of Communication

The CRC checking is performed from the first byte to the last byte before the LSB of CRC checksum

The checking method is no checking.

8. Read-only data (for monitoring)

No.	#Address	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Read cycle	Note(English)
1	33001	Max Charge Power	RO	U32	2	1	W		once only	
2	33004	Max Discharge Power	RO	U32	2	1	W		once only	
3	33006	Max PV Power	RO	U32	2	1	W		once only	
4	35001	Rate Power	RO	U16	1	1	N/A		once only	Inverter rated power
5	35003	Inverter SN	RO	STR	8	1	N/A		once only	ASCII code,16 bytes.Read together, include OEM products.
6	35011	Model Name	RO	STR	5	1	N/A		once only	ASCII code, 10 bytes(only for EH、ET PLUS)
7	35060	External Model Name	RO	STR	16	N/A	N/A		once only	
8	35103	PV1 Voltage	RO	U16	1	10	V		1s	
9	35104	PV1 Current	RO	U16	1	10	A		1s	
10	35107	PV2 Voltage	RO	U16	1	10	V		1s	
11	35108	PV2 Current	RO	U16	1	10	A		1s	
12	35345	PV MPPT1 Current	RO	U16	1	10	A		1s	
13	35105	PV MPPT1 Power	RO	U32	2	1	W		1s	200ms Average
14	35337	PV MPPT1 Power	RO	U16	1	1	W		1s	200ms Average
15	35111	PV3 Voltage	RO	U16	1	10	V		1s	
16	35112	PV3 Current	RO	U16	1	10	A		1s	
17	35115	PV4 Voltage	RO	U16	1	10	V		1s	
18	35116	PV4 Current	RO	U16	1	10	A		1s	
19	35346	PV MPPT2 Current	RO	U16	1	10	A		1s	
20	35109	PV MPPT2	RO	U32	2	1	W		1s	200ms Average

No.	#Address	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Read cycle	Note(English)
		Power								
21	35338	PV MPPT2 Power	RO	U16	1	1	W		1s	200ms Average
22	35304	PV5 Voltage	RO	U16	1	10	V		1s	
23	35305	PV5 Current	RO	U16	1	10	A		1s	
24	35306	PV6 Voltage	RO	U16	1	10	V		1s	
25	35307	PV6 Current	RO	U16	1	10	A		1s	
26	35347	PV MPPT3 Current	RO	U16	1	10	A		1s	
27	35113	PV MPPT3 Power	RO	U32	2	1	W		1s	200ms Average
28	35339	PV MPPT3 Power	RO	U16	1	1	W		1s	200ms Average
29	35308	PV7 Voltage	RO	U16	1	10	V		1s	
30	35309	PV7 Current	RO	U16	1	10	A		1s	
31	35310	PV8 Voltage	RO	U16	1	10	V		1s	
32	35311	PV8 Current	RO	U16	1	10	A		1s	
33	35348	PV MPPT4 Current	RO	U16	1	10	A		1s	
34	35117	PV MPPT4 Power	RO	U32	2	1	W		1s	200ms Average
35	35340	PV MPPT4 Power	RO	U16	1	1	W		1s	200ms Average
36	35312	PV9 Voltage	RO	U16	1	10	V		1s	
37	35313	PV9 Current	RO	U16	1	10	A		1s	
38	35314	PV10 Voltage	RO	U16	1	10	V		1s	
39	35315	PV10 Current	RO	U16	1	10	A		1s	
40	35349	PV MPPT5 Current	RO	U16	1	10	A		1s	

No.	#Address	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Read cycle	Note(English)
41	35341	PV MPPT5 Power	RO	U16	1	1	W		1s	200ms Average
42	35316	PV11 Voltage	RO	U16	1	10	V		1s	
43	35317	PV11 Current	RO	U16	1	10	A		1s	
44	35318	PV12 Voltage	RO	U16	1	10	V		1s	
45	35319	PV12 Current	RO	U16	1	10	A		1s	
46	35350	PV MPPT6 Current	RO	U16	1	10	A		1s	
47	35342	PV MPPT6 Power	RO	U16	1	1	W		1s	200ms Average
48	35320	PV13 Voltage	RO	U16	1	10	V		1s	
49	35321	PV13 Current	RO	U16	1	10	A		1s	
50	35322	PV14 Voltage	RO	U16	1	10	V		1s	
51	35323	PV14 Current	RO	U16	1	10	A		1s	
52	35351	PV MPPT7 Current	RO	U16	1	10	A		1s	
53	35343	PV MPPT7 Power	RO	U16	1	1	W		1s	200ms Average
54	35324	PV15 Voltage	RO	U16	1	10	V		1s	
55	35325	PV15 Current	RO	U16	1	10	A		1s	
56	35326	PV16 Voltage	RO	U16	1	10	V		1s	
57	35327	PV16 Current	RO	U16	1	10	A		1s	
58	35352	PV MPPT8 Current	RO	U16	1	10	A		1s	
59	35344	PV MPPT8 Power	RO	U16	1	1	W		1s	200ms Average
60	35423	PV17 Voltage	RO	U16	1	10	V		1s	
61	35424	PV17 Current	RO	U16	1	10	A		1s	
62	35425	PV18 Voltage	RO	U16	1	10	V		1s	

No.	#Address	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Read cycle	Note(English)
63	35426	PV18 Current	RO	U16	1	10	A		1s	
64	35415	PV MPPT9 Current	RO	U16	1	10	A		1s	
65	35407	PV MPPT9 Power	RO	U16	1	1	W		1s	200ms Average
66	35427	PV19 Voltage	RO	U16	1	10	V		1s	
67	35428	PV19 Current	RO	U16	1	10	A		1s	
68	35429	PV20 Voltage	RO	U16	1	10	V		1s	
69	35430	PV20 Current	RO	U16	1	10	A		1s	
70	35416	PV MPPT10 Current	RO	U16	1	10	A		1s	
71	35408	PV MPPT10 Power	RO	U16	1	1	W		1s	200ms Average
72	35121	R Phase Inverter Voltage	RO	U16	1	10	V		1s	
73	35122	R Phase Inverter Current	RO	U16	1	10	A		1s	
74	35123	R Phase Inverter Frequency	RO	U16	1	100	Hz		1s	
75	35124	R Phase Inverter Power	RO	S32	2	1	W		1s	
76	35126	S Phase Inverter Voltage	RO	U16	1	10	V		1s	
77	35127	S Phase Inverter Current	RO	U16	1	10	A		1s	
78	35128	S Phase Inverter Frequency	RO	U16	1	100	Hz		1s	
79	35129	S Phase Inverter	RO	S32	2	1	W		1s	

No.	#Address	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Read cycle	Note(English)
		Power								
80	35131	T Phase Inverter Voltage	RO	U16	1	10	V		1s	
81	35132	T Phase Inverter Current	RO	U16	1	10	A		1s	
82	35133	T Phase Inverter Frequency	RO	U16	1	100	Hz		1s	
83	35134	T Phase Inverter Power	RO	S32	2	1	W		1s	
84	35137	Total Inverter Power	RO	S32	2	1	W		1s	Total Active Power Of Inverter
85	35139	AC Active Power	RO	S32	2	1	W		1s	Total Active on Grid Power Of Inverter. (If meter connection is right, it is meter power.If meter connection is fail, it is inverter on-grid port power)
86	35141	AC Reactive Power	RO	S32	2	1	Var		1s	Total Reactive Power Of Inverter
87	35143	AC Apparent Power	RO	S32	2	1	VA		1s	Total Apparent Power Of Inverter
88	35169	Total Back-Up Load Power	RO	S32	2	1	W		1s	
89	35171	Total Load Power	RO	S32	2	1	W		1s	Total Power of on-grid load(backup not included)
90	35181	Battery1 Current	RO	S16	1	10	A		1s	
91	35182	Battery1 Power	RO	S32	2	1	W		1s	200ms Average
92	35184	Battery1 Mode	RO	U16	1	NA	NA		1s	0: No Battery, or battery disconnected 1: Standby, no discharging or charging 2: Discharging 3: Charging

No.	#Address	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Read cycle	Note(English)
93	35186	Safety Country	RO	U16	1	NA	NA		1s	Refer to Table 1-1 in appendix
94	35187	Work Mode	RO	U16	1	NA	NA		1s	Refer to Table 1-2 in appendix
95	35212	Battery Strings1	RO	U16	1	N/A	N/A		1h	
96	35262	Battery2 Voltage	RO	U16	1	10	V		1s	
97	35263	Battery2 Current	RO	S16	1	10	A		1s	
98	35264	Battery2 Power	RO	S32	2	1	W		1s	
99	35267	Battery Strings2	RO	U16	1	N/A	N/A		1h	
100	35301	PV Total Power	RO	U32	2	1	W		1s	
101	36015	Energy-Total-Sell	RO	float	2	N/A	N/A		1min	Total Feed Energy To Grid. Read from meter
102	36017	Energy-Total-Buy	RO	float	2	N/A	N/A		1min	Total Energy From Grid. Read from meter
103	36019	Meter Active Power R	RO	S32	2	1	W		1s	
104	36021	Meter Active Power S	RO	S32	2	1	W		1s	
105	36023	Meter Active Power T	RO	S32	2	1	W		1s	
106	36025	Meter Total Active Power	RO	S32	2	1	W		1s	
107	36027	Meter Reactive Power R	RO	S32	2	1	W		1s	
108	36029	Meter Reactive Power S	RO	S32	2	1	W		1s	
109	36031	Meter Reactive Power T	RO	S32	2	1	W		1s	
110	36033	Meter Total Reactive Power	RO	S32	2	1	W		1s	
111	36035	Meter Apparent	RO	S32	2	1	W		1s	

No.	#Address	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Read cycle	Note(English)
		Power R								
112	36037	Meter Apparent Power S	RO	S32	2	1	W		1s	
113	36039	Meter Apparent Power T	RO	S32	2	1	W			
114	36041	Meter Total Apparent Power	RO	S32	2	1	W			
115	36045	Meter CT2 Active Power	RO	S32	2	1	W			Only for AC Couple inverter. Detect PV inverter power
116	36052	Meter Voltage R	RO	U16	1	10	V			
117	36053	Meter Voltage S	RO	U16	1	10	V			
118	36054	Meter Voltage T	RO	U16	1	10	V			
119	36055	Meter Current R	RO	U16	1	10	A			
120	36056	Meter Current S	RO	U16	1	10	A			
121	36057	Meter Current T	RO	U16	1	10	A			
122	36133	Meter Total Active Power	RO	S32	2	1	W			
123	37004	Max BMS Charge Current	RO	U16	1	1	A			
124	37005	Max BMS Discharge Current	RO	U16	1	1	A			
125	37007	BMS1 SOC	RO	U16	1	1	%			
126	37008	BMS1 SOH	RO	U16	1	1	%			BMS1 SOH
129	37076	BMS1 Rated Capacity	RO	U16	1	10	kWh			GoodWe battery only
130	37080	BMS1 Bat power	RO	U32	2	N/A	w			GoodWe battery only
131	39005	BMS2 SOC	RO	U16	1	1	%			
132	39006	BMS2 SOH	RO	U16	1	1	%			BMS2 SOH

No.	#Address	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Read cycle	Note(English)
133	39074	BMS2 Rated Capacity	RO	U16	1	10	kWh			GoodWe battery only
134	39078	BMS2 Bat power	RO	U32	2	N/A	W			GoodWe battery only

9. Readable and writable data (for control)

No.	#Addresses	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Flash Save	Write cycle	Note(English)
1	42000	EMS Power Mode	RW	U16	1	N/A	N/A		N	1s	Refer to Table 1-4 in appendix (support for UNIQ/ESG2/ET30/ETG2/ET50/ET100/ETR125/ETLV/ESLD/ESA/EOG2/ESG3 /ETG3)
2	42001	EMS Power Set	RW	U32	2	N/A	N/A		N	1s	Refer to Table 1-4 in appendix (support for UNIQ/ESG2/ET30/ETG2/ET50/ET100/ETR125/ETLV/ESLD/ESA/EOG2/ESG3 /ETG3)
3	42003	Export power limit enable	RW	U16	1	1	N/A	[0,1]			0:disable 1:enable (support for UNIQ/ESG2/ET30/ETG2/ET50/ET100/ETR125/ETLV/ESLD/ESA/EOG2/ESG3 /ETG3)
4	42004	Export power limit	RW	S32	2	1	W	[0,0]			If the export power limit switch is set to 1, this register setting

No.	#Addresses	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Flash Save	Write cycle	Note(English)
		Parameter									allows the maximum output power. For the single unit of the energy storage machine with a maximum AC power greater than 30K or when operating in parallel, the export power limit setting value uses this register.support for UNIQ/ESG2/ET30/ETG2/ET50/ET100/ETR125/ETLV/ESLD/ESA/EOG2/ESG3 /ETG3)
5	45264	Three Phase Unbalanced Output	RW	U16	1	N/A	N/A	[0,1]	Y	once only	this function is deactivated as default, set "1" to activate. After activated, All power needs to be turned off and restarted
6	45350	Battery1 Capacity	RW	U16	1	1	AH	[25,2000]	Y	once only	
7	45351	Battery1 Strings	RW	U16	1	1	N/A	[4,12]	Y	once only	
8	45352	Battery1 Charge Voltage Max	RW	U16	1	10	V	[400,7200]	Y	once only	these registers is to set the protection Parameters on Battery charge/discharge operation ON INVERTER SIDE. The real operation will still follow Battery BMS limitations (or registers 47900~47916) if it is not out of the range.
9	45353	Battery1 Charge Current Max	RW	U16	1	10	A	[0,3000]	Y	once only	
10	45355	Battery1 Discharge	RW	U16	1	10	A	[0,3000]	Y	once only	

No.	#Addresses	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Flash Save	Write cycle	Note(English)
		Current Max									Eg. Set Batt Charge Curr Max (45353) as 25A, but Battery BMS limit the max charge Current as 20A, then the Battery charge at max 20A. but if Battery BMS limit max charge Current as 50A, then the real charge Current of the Battery will exceed 25A.
11	45356	Battery1 SOC Under Min	RW	U16	1	1	%	[0,100]	Y	once only	
12	45358	Battery1 Offline SOC Under Min	RW	U16	1	N/A	%	[0,100]	Y	once only	
13	45377	Battery2 Charge Voltage Max	RW	U16	1	10	V	[2000,7200]	Y	once only	
14	45378	Battery2 Charge Current Max	RW	U16	1	10	A	[0,1000]	Y	once only	
15	45380	Battery2 Discharge Current Max	RW	U16	1	10	A	[0,1000]	Y	once only	
16	45381	Battery2 SOC Under Min	RW	U16	1	1	%	[0,100]	Y	once only	
17	45383	Battery2 Offline SOC Under Min	RW	U16	1	N/A	%	[0,100]	Y	once only	
18	47505	EMS Fallback Mode	RW	U16	1	N/A	N/A		Y	once only	If using EMS, you can set 47505 to 2/3/10.The default value is 10. if you set to"2",If no instruction from 47511 is received within 30 seconds, the inverter will shut

No.	#Addresses	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Flash Save	Write cycle	Note(English)
											down. if you set to"3",If no instruction from 47511 is received within 30 seconds, the inverter will enter self-use mode.(now,this value only for EH/EHB/AES/ETG1) if you set to"10",If no instruction from 47511 is received within 30 seconds, the inverter will keep the last set mode.
19	47509	Export power limit enable	RW	U16	1	N/A	N/A	[0,1]	Y	once only	1:total power anti-counter Current Use Export power limit enable (47509) to activate export power limit function. And EMS Power Set (47510) to set the max allowed export power to Grid. The 42004-42005 register is used to set the maximum allowable output power to the power grid when the AC power of a single inverter is greater than 30K or when the inverter is in parallel
20	47510	Export power limit Parameter	RW	S16	1	N/A	W	[-30000,30000]	Y	once only	
21	47511	EMS Power Mode	RW	U16	1	N/A	N/A		N	1s	Refer to Table 1-4 in appendix (support for ETG1/EH/EHB/AEB/UNIQ/ESG2/ET30/ETG2/ET50/ETLV/ESLD/ESA/EOG2/ESG3 /ETG3)

No.	#Addresses	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Flash Save	Write cycle	Note(English)
22	47512	EMS Power Set	RW	U16	1	N/A	W		N	1s	Refer to Table 1-4 in appendix (support for ETG1/EH/EHB/AEB/UNIQ/ESG2/ET30/ETG2/ET50/ETLV/ESLD/ESA/EOG2/ESG3 /ETG3)
23	47531	Start Charge SOC	RW	U16	1	10	%		Y	once only	To set the SOC Level to start/stop Battery force charge. (this is not the command from BMS, but the protection on inverter side. Eg. Start chg SOC (47531) is set as 5%, but the Battery BMS gives a force charge signal at SOC 6%, then Battery will start force charge at 6% SOC; if BMS does not send force charge command at 5% SOC, then Battery will still start force charge at 5% SOC.) Note: the default setting is 5% SOC to start and 10% to stop. force charge power is 1000W from PV or Grid as well.
24	47532	Stop Charge SOC	RW	U16	1	10	%		Y	once only	
25	47534	3 Phase Export Power Limit Enable	RW	U16	1	N/A	N/A	[0,1]	Y	1s	
26	47535	R phase	RW	S16	1	N/A	W	[-30000,3	Y	1s	

No.	#Addresses	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Flash Save	Write cycle	Note(English)
		Export Power Limit Parameter						0000]			
27	47536	S phase Export Power Limit Parameter	RW	S16	1	N/A	W	[-30000,30000]	Y	1s	
28	47537	T phase Export Power Limit Parameter	RW	S16	1	N/A	W	[-30000,30000]	Y	1s	
29	47545	Fast Charge Enable	RW	U16	1	N/A	1	[0,3]	N	if needed	0: Disable 1:Enable
30	47546	Fast Charge Stop SOC	RW	U16	1	N/A	1	[1,100]	N	if needed	
31	47603	Fast Charge Power Percent	RW	U16	1	N/A	%	[0,100]	N	if needed	allowable Grid charge power,default 100
32	47903	Max BMS1 Battery Charge Current	RW	U16	1	N/A	A		N	if needed	the REAL-TIME max charge Current limit from Battery BMS
33	47905	Min BMS1 Battery Discharge Current	RW	U16	1	N/A	A		N	if needed	the REAL-TIME max discharge Current limit from Battery BMS
34	47916	BMS Communicati	RW	U16	1	N/A	N/A		N	if needed	Use EMS to set the max/min voltage and current, this register

No.	#Addresses	English Name	#R/W	#Type	#Size	#SF	#Units	Range	Flash Save	Write cycle	Note(English)
		on Loss Disable									need to set 1.
35	47921	Max BMS Battery2 Charge Current	RW	U16	1	N/A	A		N	if needed	
36	47923	Min BMS Battery2 Discharge Current	RW	U16	1	N/A	A		N	if needed	
37	47934	BMS2 Communication Loss Disable	RW	U16	1	N/A	N/A		N	if needed	Use EMS to set the max/min voltage and current, this register need to set 1.

10. Third-party EMS reference settings

	purpose	Read&Write registers needed:	Reference01
1	Charge if solar but do not import(optional)	42000/47511 write 2, then 42001/47512 write 0	
2	Charge at set limit from grid (for example 500W) (optional)	42000/47511 write 4, then 42001/47512 write X	Unit : W Example: charge 500W, then X can be written 500 if write 0, this means no charge or discharge,
3	Discharge to cover home needs so that import is not needed (optional)	42000/47511 write 1	if 47505 write 2, but don't write 42000/47511 within 30 seconds, then the inverter will go into waiting model
4	Self consumption, discharge if solar does not cover home needs (required)	42000/47511 write 1	
5	Charge as fast as possible from grid	42000/47511 write 11 to charge, then 42001/47512 write X to set charge power default power: Rated power	
6	Discharge as fast as possible to grid (required)	42000/47511 write 12 to discharge 42001/47512 write X to set discharge power	Unit : W Example: discharge 100W, then X can be written 100 if write 0, this means no charge or discharge
7	Idle, battery does nothing (required)	42000/47511 write 8	
Noted	Register 42000/47511/42001/47512 write cycle 1000ms. Other writable registers are written only once. Read-only register read cycle 1000ms. Reading and writing timeout time 500ms.		

Modbus TCP connection settings		
	Description	Default value
1	IP Address	Disable DHCP for the device in the network settings; obtain a static IP address
2	Port	502
3	Slave ID	Same as the Modbus RTU slave address; default is 247
4	Connect Timeout	3000ms
5	Response Timeout	1000ms
6	Retry Count	3
7	Reconnect Delay	3000ms

8	Max Read Length	100
Note d	When using Modbus TCP for access, the Modbus TCP function needs to be enabled via SEMS+.	

11.Appendix

Table 1-2 Work Mode		
Mode	Code	Description
Wait	0x00	cut off all the connection to Inverter
On-Grid	0x01	PV inputs to Inverter, Inverter outputs to Grid
Off-Grid	0x02	PV inputs to Inverter(1st),Battery inputs to Inverter(2nd),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 1-4 EMS Mode						
EMS Power Mode						
Function	Mode	COMMAND		PV	Grid	Bat
		Code	rSet			
System shutdown	Stopped	0x00FF	NA			
	Note :Stop working and switch to wait mode					
Self-use	Auto	0x0001	NA			
	Note: PBattery =PInv - Pmeter – Ppv (Discharge/Charge)					
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	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. PV do not support the loads first.					
Off-Grid Mode	Off-Grid	0x0007	NA			

