Modbus Protocol V4.25

Directory

1 Protocol Description

The Modbus communication adopts 2-line RS-485 interface, and a single host can connect up to 247 inverters.
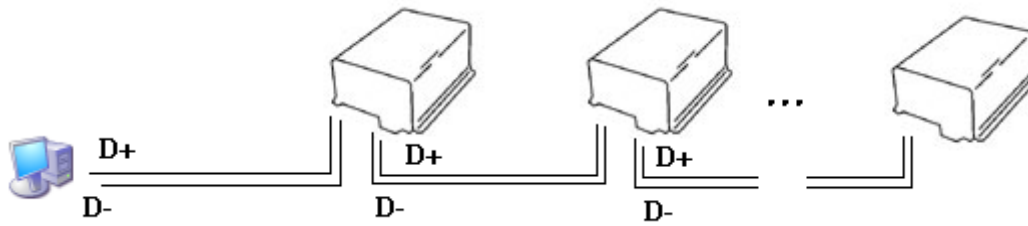
Figure 1

Modbus communication parameters:

Parameter	Description
Transfer mode	RTU mode
Communication mode	Half duplex
Baud rate	9600
Start bit	1
Data bit	8
Check bit	None
Stop bit	1

Technical terms：

Item	Description
Host	The one that initiates communication is called the host
Slave	The one that passive responses command called the slave
Broadcast address	0
Default address	1
U16	Unsigned integer of 16-bit
U32	Unsigned integer of 32-bit
S16	Signed integer of 16-bit
S32	Signed integer of 32-bit
CRC check	16 bit CRC check, low byte in front
RO	Read only, only support 0x03 command
WO	Write only, only support 0x06 command
RW	Read and write, support 0x03、0x6、0x10 command

2 Register definition

2.1 Device information

Index	Definition	Address	Register Number	Type	Comment	R/W	Unit
1	Device Model	0x1A00	8	U16	Ex.：PV 30KTL	RO	ASCII
2	Device Serial Number	0x1A10	8	U16	Ex.：1234-123456789	RO	ASCII
3	Modbus Protocol Version	0x1A18	1	U16	Ex.：0x1234=V12.34	RO	
4	Master Software Version	0x1A1C	3	string	Ex.：123456	RO	ASCII
5	Master Software Build Date	0x1A23	3	string	Ex.：123456	RO	ASCII
6	Slave firmware version	0x1A26	3	string	Ex.：123456	RO	ASCII
7	Slave firmware build date	0x1A2D	3	string	Ex.：123456	RO	ASCII
8	MPPT Number	0x1A3B	1	U16	Ex.：1=1 MPPT	RO	
9	Rated Voltage	0x1A44	1	U16	Ex.：2200 = 220V	RO	0.1V
10	Rated Frequency	0x1A45	1	U16	Ex.：5000 = 50Hz	RO	0.01Hz
11	Rated Power	0x1A46	1	U16	Ex.：1500 = 1500W	RO	1W
12	Grid Phase Number	0x1A48	1	U16	Ex.：1=single phase 3=3 phase	RO	
13	Production type	0x1A5A	1	U16	0x0000: On grid 0x0001: AC couple no smart load 0x0002: Hybrid no smart load 0x0003: Hybrid with smart load 0x0004: AC couple with smart load	RO	
14	EMS Firmware Version	0x1A60	3	string	Ex.：123456	RO	ASCII
15	EMS Firmware build date	0x1A67	7	string	Ex. "20131105100530" (YYYYMMDDhhmmss)	RO	ASCII
16	DCDC Firmware Version	0x1A6Fa	3	string	Ex.：123456	RO	ASCII
17	DCDC firmware build date	0x1A76	3	string	Ex.：123456	RO	ASCII

2.2 Real time data

Index	Definition	Address	Register Number	Type	Comment	R/W	Unit
1	Phase A Voltage	0x1001	1	U16		RO	0.1V
2	Phase A Current	0x1002	1	U16		RO	0.01A
3	Phase A Power	0x1003	2	S32		RO	0.1W
4	Phase A Frequency	0x1005	1	U16		RO	0.01Hz
5	Phase B Voltage	0x1006	1	U16		RO	0.1V
6	Phase B Current	0x1007	1	U16		RO	0.01A
7	Phase B Power	0x1008	2	S32		RO	0.1W
8	Phase B Frequency	0x100A	1	U16		RO	0.01Hz
9	Phase C Voltage	0x100B	1	U16		RO	0.1V
10	Phase C Current	0x100C	1	U16		RO	0.01A
11	Phase C Power	0x100D	2	S32		RO	0.1W
12	Phase C Frequency	0x100F	1	U16		RO	0.01Hz
13	PV1 Voltage	0x1010	1	U16		RO	0.1V
14	PV1 Current	0x1011	1	U16		RO	0.01A
15	MPPT1 Power	0x1012	2	U32		RO	0.1W
16	PV2 Voltage	0x1014	1	U16		RO	0.1V
17	PV2 Current	0x1015	1	U16		RO	0.01A
18	MPPT2 Power	0x1016	2	U32		RO	0.1W
19	PV3 Voltage	0x1018	1	U16		RO	0.1V
20	PV3 Current	0x1019	1	U16		RO	0.01A
21	MPPT3 Power	0x101A	2	U32		RO	0.1W
22	Inner Temperature	0x101C	1	S16		RO	1°C
23	Inverter Mode	0x101D	1	U16	refer"InverterModeTable"	RO	
24	Error Code1	0x101E	1	U16	refer"ErrorCodeTable2"	RO	
25	Error Code2	0x101F	1	U16	refer"ErrorCodeTable1"	R0	
26	Error Code3	0x1020	1	U16	refer"ErrorCodeTable3"	RO	
27	Total Energy	0x1021	2	U32		RO	kwh

28	Total Generation Time	0x1023	2	U32		RO	Hour
29	Today Energy	0x1027	2	U32		RO	wh
30	Active Power	0x1037	2	S32		RO	0.1W
31	Reactive Power	0x1039	2	S32		RO	0.1Var
32	Today Peak Power	0x103B	2	S32		RO	0.1W
33	Power Factor	0x103D	1	S16		RO	0.001
34	PV4 Voltage	0x103E	1	U16		RO	0.1V
35	PV4 Current	0x103F	1	U16		RO	0.01A
36	MPPT4 Power	0x1040	2	U32		RO	0.1W
37	PV totally input power	0X1048	2	U32		RO	0.1W
38	Decimals of total energy	0x104C	1	U16	Relate to 0x1021, if total energy is 220.836kwh, then 0x104C is 836wh	RO	Wh
39	PV5 Voltage	0x1080	1	U16		RO	0.1V
40	PV5 Current	0x1081	1	U16		RO	0.01A
41	MPPT5 Power	0x1082	2	U32		RO	0.1W
42	PV6 Voltage	0x1084	1	U16		RO	0.1V
43	PV6 Current	0x1085	1	U16		RO	0.01A
44	MPPT6 Power	0x1086	2	U32		RO	0.1W
45	PV7 Voltage	0x1088	1	U16		RO	0.1V
46	PV7 Current	0x1089	1	U16		RO	0.01A
47	MPPT7 Power	0x108A	2	U32		RO	0.1W
48	PV8 Voltage	0x108C	1	U16		RO	0.1V
49	PV8 Current	0x108D	1	U16		RO	0.01A
50	MPPT8 Power	0x108E	2	U32		RO	0.1W
51	PV9 Voltage	0x1090	1	U16		RO	0.1V
52	PV9 Current	0x1091	1	U16		RO	0.01A
53	MPPT9 Power	0x1092	2	U32		RO	0.1W
54	Phase R watt of grid	0x1300	2	S32		RO	0.1W
55	Phase S watt of grid	0x1302	2	S32		RO	0.1W
56	Phase T watt of grid	0x1304	2	S32		RO	0.1W
57	Accumulated energy of	0x1306	2	U32		RO	10Wh

	positive					
58	Accumulated energy of negative	0x1308	2	U32		RO	10Wh
59	Phase R watt of load	0x130A	2	S32		RO	0.1W
60	Phase S watt of load	0x130C	2	S32		RO	0.1W
61	Phase T watt of load	0x130E	2	S32		RO	0.1W
62	Accumulated energy of load	0x1310	2	U32		RO	10Wh
63	L1-N phase voltage of grid	0x131A	1	U16		RO	0.1V
64	L2-N phase voltage of grid	0x131B	1	U16		RO	0.1V
65	L3-N phase voltage of grid	0x131C	1	U16		RO	0.1V
66	L1 current of grid	0x131D	2	S32		RO	0.01A
67	L2 current of grid	0x131F	2	S32		RO	0.01A
68	L3 current of grid	0x1321	2	S32		RO	0.01A
69	L1-N phase voltage of load	0x1323	1	U16		RO	0.1V
70	L2-N phase voltage of load	0x1324	1	U16		RO	0.1V
71	L3-N phase voltage of load	0x1325	1	U16		RO	0.1V
72	L1 current of load	0x1326	2	S32		RO	0.01A
73	L2 current of load	0x1328	2	S32		RO	0.01A
74	L3 current of load	0x132A	2	S32		RO	0.01A
75	Today import Energy	0x1332	2	U32		RO	10Wh
76	Today export Energy	0x1334	2	U32		RO	10Wh
77	Today load Energy	0x1336	2	U32		RO	10Wh
78	Frequency of grid	0x1338	1	U16		RO	0.01Hz
79	Phase R voltage of EPS	0x1350	1	U16		RO	0.1V
80	Phase R current of EPS	0x1351	2	S32		RO	0.01A
81	Phase R watt of EPS	0x1353	2	S32		RO	0.1W
82	Frequency of EPS	0x1355	1	U16		RO	0.01Hz
83	Phase S voltage of EPS	0x1356	1	U16		RO	0.1V
84	Phase S current of EPS	0x1357	2	S32		RO	0.01A
85	Phase S watt of EPS	0x1359	2	S32		RO	0.1W
86	Phase T voltage of EPS	0x135B	1	U16		RO	0.1V
87	Phase T current of EPS	0x135C	2	S32		RO	0.01A
88	Phase T watt of EPS	0x135E	2	S32		RO	0.1W
89	Daily energy to EPS	0x1360	2	U32		RO	10Wh
90	Accumulated energy to EPS	0x1362	2	U32		RO	10Wh
91	Battery SOC	0x2000	1	U16		RO	%
92	Battery temperature	0x2001	1	S16		RO	1℃

93	Battery voltage	0x2006	1	U16		RO	0.1V
94	Battery current	0x2007	2	S32		RO	0.01A
95	Battery power	0x2009	2	U32		RO	0.1W
96	Battery daily charge energy	0x200B	2	U32		RO	10Wh
97	Battery accumulated charge energy	0x200D	2	U32		RO	10Wh
98	Battery daily discharge energy	0x200F	2	U32		RO	10Wh
99	Battery accumulated discharge energy	0x2011	2	U32		RO	10Wh
100	Error message 4	0x2013	1	U16		RO	

2.3 Parameter1

Index	Definition	Address	Register Number	Type	Comment	R/W	Unit
1	Hybrid work mode	0x2100	1	U16	0x0000: Self used mode 0x0001: Feed-in priority mode 0x0002: Time-based control 0x0003: Back-up mode	RW	
2	Once/Everyday	0x2101	1	U16	Once:0;Everyday: 1 Time-based control	RW	
3	Charge start time 1	0x2102	1	U16	Time-based control High Byte : Hour Low Byte : Minute	RW	
4	Charge end time 1	0x2103	1	U16	Time-based control High Byte : Hour Low Byte : Minute	RW	
5	Discharge start time 1	0x2104	1	U16	Time-based control High Byte : Hour Low Byte : Minute	RW	
6	Discharge end time 1	0x2105	1	U16	Time-based control High Byte : Hour Low Byte : Minute	RW	
7	Battery type selection	0x2110	1	U16	Battery type 0x0000 : Unavailable 0x0001 : Lead-Acid battery 0x0002 : PYLON Lithium-ion 0x0003 : Dyness Lithium-ion 0x0004 : Aobo Lithium-ion 0x0005 : UZ Lithium-ion 0x0006 : VestMoods Lithium-ion 0x0007: XinYi Lithium-ion	RW	
8	Comm Address	0x2111	1	U16	BMS Comm Address of Lithium-ion battery	RW	
9	Battery Ah(Ah)	0x2112	1	U16	Capacity of lead-acid battery	RW	Ah

10	Stop discharge voltage	0x2113	1	U16	Stop discharge voltage of lead-acid battery	RW	0.1V
11	Stop charge voltage	0x2114	1	U16	Stop charge voltage of lead-acid battery	RW	0.1V
12	Grid charge	0x2115	1	U16	Grid charge function 0x0000 : Disable 0x0001 : Enable	RW	
13	Maximum grid charger power（W）	0x2116	1	U16	Maximum grid charger power（W）	RW	W
14	Capacity of grid charger end(%)	0x2117	1	U16	Capacity of grid charger end(%)	RW	%
15	Maximum charger power(W)	0x2118	1	U16	Maximum charger power(W)	RW	W
16	Capacity of charger end(%)	0x2119	1	U16	Capacity of charger end(%) SOC	RW	%
17	Maximum discharger power(W)	0x211A	1	U16	Maximum discharger power(W)	RW	W
18	Capacity of discharger end(%)	0x211B	1	U16	Capacity of discharger end(%) EOD	RW	%
19	Off-grid mode	0x211C	1	U16	0x0000 : Disable 0x0001 : Enable	RW	
20	Rated output voltage(V)	0x211D	1	U16	Output rated voltage in off-grid mode 200/220/230/240	RW	0.1V
21	Rated output frequency(Hz)	0x211E	1	U16	Output rated frequency in off-grid mode50/60Hz	RW	0.01Hz
22	Off-grid start-up battery capacity（%）	0x211F	1	U16	The minimum battery capacity to transfer off-grid mode	RW	%
23	Maximum discharge current	0x2120	1	U16	Maximum discharge current	RW	0.01A
24	Maximum charger current	0x2121	1	U16	Maximum charger current	RW	0.01A
25	Force Charg Start SOC	0x2144	1	U16	Force Charg Start SOC	RW	%

26	Force Charg End SOC	0x2145	1	U16	Force Charg End SOC	RW	%

2.4　Parameters2

Index	Definition	Address	Register Number	Type	Comment	R/W	Unit
1	Date：Year	0x3000	1	U16	Example: 0x07E1 = 2017	RW	
2	Date：Month + Day	0x3001	1	U16	High Byte=Month Low Byte=Day	RW	
3	Date：Hour + Minute	0x3002	1	U16	High Byte =Hour Low Byte =Minute	RW	
4	Date：Second + 0	0x3003	1	U16	High Byte =Second Low Byte =0	RW	
5	Modbus Address	0x303E	1	U16	Default 1	RW	1~247
6	RS485 baud rate	0x304C	1	U16	0x0000 : 1200 0x0001 : 2400 0x0002 : 4800 0x0003 : 9600 0x0004 : 14400 0x0005 : 19200 0x0006 : 38400 0x0007 : 57600 0x0008 : 115200 0x0009 : 230400 0x000A : 460800 0x000B : 921600	RW	
7	Output active power de-rating(high word)	0x3085	1	U16		RW	W
8	Output active power de-rating(Low word)	0x3086	1	U16		RW	W
9	Digital meter modbus address	0x30B0	1	U16	Default 1	RW	1~255
10	Digital meter Type	0x30B1	1	U16	0x0000 : Unknown 0x0001 : Gavazzi/EM340DINAV23XS1X 0x0002 : CHINT/DTSU666 0x0003 : Acrel/DTSF1352-C 0x0004 : Lovato/DMG210 0x0005 : G2000	RW	

					0x0006 : Gavazzi/ET112		
					0x0007 : KSEM		
					0x0008 : CHINT/DDSU666		
11	Digital meter power direction	0x30B2	1	U16	0x0000 : Positive 0x0001 : Negative	RW	
12	Power limit function	0x30B3	1	U16	0x0000 : Disable 0x0001 : Power limit by external device(G2000) 0x0002 : Power limit by PVI external CT sensor 0x0003 : Power limit by digital meter device	RW	
13	Power limit CT ratio	0x30B4	1	U16	Power limit external CT ratio 0x0000 : Unknown 0x0001 : 1000 : 1 0x0002 : 2000 : 1 0x0003 : 2500 : 1 0x0004 : 3000 : 1 0x0005 : 4000 : 1 0x0006 : 5000 : 1 0x0007 : 6000 : 1 0x0008 : 10000 : 1	RW	
14	Power limit mode	0x30B5	1	U16	0x0000 : CT on Grid (Meter on Grid) 0x0001 : CT on Load (Meter on Load)	RW	
15	Maximum feed in grid power	0x30B9	2	U32	High byte : 0~65535 Low byte : 0~65535 Max. power will limit the Max. range by model	RW	w
16	Soft start time	0x5000	1	U16	[10, 600]	RW	s
17	Reconnect time	0x5001	1	U16	[10, 900]	RW	s
18	Grid frequency high loss level 1 limit	0x5002	1	U16	[1, 1.2] * rated Frequency	RW	0.01Hz
19	Grid frequency low loss level 1 limit	0x5003	1	U16	[0.8, 1] * rated Frequency	RW	0.01Hz
20	Grid voltage high loss level 1 limit	0x5004	1	U16	[1, 1.36] * rated Voltage	RW	0.1V
21	Grid voltage low loss level 1	0x5005	1	U16	[0.3, 1] * rated Voltage	RW	0.1V

	limit		1	U16		RW	
22	Grid frequency high loss level 1 trip time	0x5006	1	U16	[50, 60000]	RW	1ms Notice2
23	Grid frequency low loss level 1 trip time	0x5007	1	U16	[50, 60000]	RW	1ms Notice2
24	Grid voltage high loss level 1 trip time	0x5008	1	U16	[50, 60000]	RW	1ms Notice2
25	Grid voltage low loss level 1 trip time	0x5009	1	U16	[50, 60000]	RW	1ms Notice2
26	Grid frequency high loss level 2 limit	0x500A	1	U16	[1, 1.2] * rated Frequency	RW	0.01Hz
27	Grid frequency low loss level 2 limit	0x500B	1	U16	[0.8, 1] * rated Frequency	RW	0.01Hz
28	Grid voltage high loss level 2 limit	0x500C	1	U16	[1, 1.36] * rated Voltage	RW	0.1V
29	Grid voltage low loss level 2 limit	0x500D	1	U16	[0.3, 1] * rated Voltage	RW	0.1V
30	Grid frequency high loss level 2 trip time	0x500E	1	U16	[50, 60000]	RW	1ms Notice2
31	Grid frequency low loss level 2 trip time	0x500F	1	U16	[50, 60000]	RW	1ms Notice2
32	Grid voltage high loss level 2 trip time	0x5010	1	U16	[50, 60000]	RW	1ms Notice2
33	Grid voltage low loss level 2 trip time	0x5011	1	U16	[50, 60000]	RW	1ms Notice2
34	10 min average	0x5018	1	U16		RW	0.1V

	sustained voltage						
35	Soft ramp up after reconnect	0x5019	1	U16	[0,100]	RW	%/min
36	Power reduction base on frequency	0x501A	1	U16		RW	0.1%/Hz
37	Insulation resistance active limit	0x501B	1	U16		RW	1KΩ
38	Grid over voltage de-rating point	0x501E	1	U16	[1, 1.5] * rated Voltage	RW	0.1V
39	Grid frequency high Level 1 trip time (High word)	0x501F	1	U16	[0,9]	RW	ms
40	Grid frequency low Level 1 trip time (High word)	0x5020	1	U16	[0,9]	RW	ms
41	Grid Voltage High Level 1 trip time (High word)	0x5025	1	U16	[0,9]	RW	ms
42	Grid Voltage Low Level 1 trip time (High word)	0x5026	1	U16	[0,9]	RW	ms
43	Trigger time of 10 min average sustained voltage	0x502B	1	U16		RW	s
44	Output reactive power mode	0x5030	1	U16	Output reactive power mode 0x0000: Pure active power 0x0001: cosφ = const. relation with [0x5031] 0x0002: Q = const. relation with [0x5032] | [0x5114]	RW	

					0x0003: cosφ(P) ,relation with [0x5034~0x503B], [0x5045,0x5046 CEI-021 only] 0x0004: Q(U), relation with [0x503C~0x5044], [0x5047,0x5048 CEI-021 & PEA only] 0x0005: AUTO P(U) 0x0006: Watt(U) AS4777, Pure active power ,relation with [0x5049~0x5050] 0x0007: Q(U) AS4777, relation with [0x5051~0x5058] 0x0008: Q = const. (P priority), relation with [0x5114] 0x0009: Q(P) Curve , relation with [0x505A~0x5061]		
45	Power factor setting	0x5031	1	S16	[-1000, -800],[800, 1000]	RW	0.001pf
46	Reactive control response time	0x5033	1	U16	[1,120]	RW	s
47	Q(U) curve node1 percent(U/Un)	0x503C	1	U16	[80,120]	RW	%
48	Q(U) curve node2 percent(U/Un)	0x503D	1	U16	[80,120]	RW	%
49	Q(U) curve node3 percent(U/Un)	0x503E	1	U16	[80,120]	RW	%
50	Q(U) curve node4 percent(U/Un)	0x503F	1	U16	[80,120]	RW	%
51	Q(U) curve node1 value setting (Q/S)	0x5040	1	S16	[-600,600]	RW	0.1%
52	Q(U) curve node2 value setting (Q/S)	0x5041	1	S16	[-600,600]	RW	0.1%

53	Q(U) curve node3 value setting (Q/S)	0x5042	1	S16	[-600,600]	RW	0.1%
54	Q(U) curve node4 value setting (Q/S)	0x5043	1	S16	[-600,600]	RW	0.1%
55	Volt-Watt node 1 voltage	0x5049	1	U16		RW	0.1V
56	Volt-Watt node 2 voltage	0x504A	1	U16		RW	0.1V
57	Volt-Watt node 3 voltage	0x504B	1	U16		RW	0.1V
58	Volt-Watt node 4 voltage	0x504C	1	U16		RW	0.1V
59	Volt-Watt node 1 power percent	0x504D	1	U16	[0,100]	RW	%
60	Volt-Watt node 2 power percent	0x504E	1	U16	[0,100]	RW	%
61	Volt-Watt node 3 power percent	0x504F	1	U16	[0,100]	RW	%
62	Volt-Watt node 4 power percent	0x5050	1	U16	[0,100]	RW	%
63	Volt-Var node 1 voltage	0x5051	1	U16		RW	0.1V
64	Volt-Var node 2 voltage	0x5052	1	U16		RW	0.1V
65	Volt-Var node 3 voltage	0x5053	1	U16		RW	0.1V
66	Volt-Var node 4 voltage	0x5054	1	U16		RW	0.1V
67	Volt-Var node 1 Var percent	0x5055	1	S16	[-600,600], (+) Positive: over-excited (lag, inductive) (-) Negative: under-excited (lead, capacitive)	RW	0.10%

68	Volt-Var node 2 Var percent	0x5056	1	S16	[-600,600], (+) Positive: over-excited (lag, inductive) (-) Negative: under-excited (lead, capacitive)	RW	0.10%
69	Volt-Var node 3 Var percent	0x5057	1	S16	[-600,600], (+) Positive: over-excited (lag, inductive) (-) Negative: under-excited (lead, capacitive)	RW	0.10%
70	Volt-Var node 4 Var percent	0x5058	1	S16	[-600,600], (+) Positive: over-excited (lag, inductive) (-) Negative: under-excited (lead, capacitive)	RW	0.10%
71	Q(P) curve node 1 percentage setting (P/Pn)	0x505A	1	U16	[0,100]	RW	%
72	Q(P) curve node 2 percentage setting (P/Pn)	0x505B	1	U16	[0,100]	RW	%
73	Q(P) curve node 3 percentage setting (P/Pn)	0x505C	1	U16	[0,100]	RW	%

74	Q(P) curve node 4 percentage setting (P/Pn)	0x505D	1	U16	[0,100]	RW	%
75	Q(P) curve node 1 value setting (Q/Pn)	0x505E	1	S16	[-600,600]	RW	0.10%
76	Q(P) curve node 2 value setting (Q/Pn)	0x505F	1	S16	[-600,600]	RW	0.10%
77	Q(P) curve node 3 value setting (Q/Pn)	0x5060	1	S16	[-600,600]	RW	0.10%
78	Q(P) curve node 4 value setting (Q/Pn)	0x5061	1	S16	[-600,600]	RW	0.10%
79	Regulation code	0x5101	1	U16	refer"RegulationCodeTable"	RW	
80	Derating Watt Percent	0x5104	1	U16	[10, 100], percent of rated power		%
81	Islanding detection	0x510E	1	U16	0: disable,1: enable	RW	

82	Unbalance voltage limit	0x510F	1	U16	[1, 20], percent of rated voltage Notice1	RW	%
83	Ground current limit	0x5110	1	U16	[10, 300]	RW	mA
84	PV String detection	0x5111	1	U16	0: disable,1: enable Notice1	RW	
85	Low voltage through detection	0x5112	1	U16	0: disable,1: enable Notice1	RW	
86	Insulate Type	0x5113	1	U16	0: with ground line, no transformer 1: no ground line, with transformer 2: with ground line, with transformer Notice1	RW	
87	Reactive Power Percent	0x5114	1	S16	[-60, 60], percent of rated power	RW	%
88	Adjust Resistance	0x5115	1	U16	0: open,1: close Notice1	RW	
89	Insulation Resistor Detection	0x5117	1	U16	0: disable,1: enable	RW	
90	Ground Current Detection	0x5118	1	U16	0: disable,1: enable	RW	
91	Grid high voltage load de-rating function	0x511D	1	U16	0x0000: Disable 0x0001: Enable Relation with [0x501E]	RW	
92	Inverter control	0x6001	1	U16	0: power on,1: shut down	RW	

3 Modbus Protocol Command

3.1 Function code list

Index	Function code	Description
1	0x03	Read Register
2	0x06	Write a single Register
3	0x10	Write multiple Registers

3.2 Read Register (0x03)

(1) Host query command format：

Parameter	Length	Description
Slave address	1 byte	1~247
Function code	1 byte	0x03
Register Start address	2 byte	0x0000~0xFFFF
Register number	2 byte	1~124
CRC code	2 byte	

(2) Slave normal respond format：

Parameter	Length	Description
Slave address	1 byte	1~247
Function code	1 byte	0x03
Byte number	2 byte	Register Number*2
Register value	2 ~248 byte	
CRC code	2 byte	

(1) Slave abnormal respond format：

Parameter	Length	Description
Slave address	1 byte	1~247
Function code	1 byte	0x83
Abnormal code	1 byte	refer"AbnormalCodeTable"
CRC code	2 byte	

(2) Example：

　　Host query command ： 01 03 10 01 00 01 D1 0A

　　Slave normal respond ： 01 03 02 08 FC BF C5

Slave abnormal respond： 01 83 02 C0 F1

3.3 Write a single Register (0x06)

(1) Host query command format：

Parameter	Length	Description
Slave address	1 byte	1~247
Function code	1 byte	0x06
Address	2 byte	0x0000~0xFFFF
Register value	2 byte	0x0000~0xFFFF
CRC code	2 byte	

(2) Slave normal respond：

Parameter	Length	Description
Slave address	1 byte	1~247
Function code	1 byte	0x06
Address	2 byte	0x0000~0xFFFF
Register value	2 byte	0x0000~0xFFFF
CRC code	2 byte	

(3) Slave abnormal respond：

Parameter 定义	Length	Description
Slave address	1 byte	1~247
Function code	1 byte	0x86
Abnormal code	1 byte	refer"AbnormalCodeTable"
CRC code	2 byte	

(4) Example：

Host query command ： 01 06 51 01 00 01 09 36

Slave normal respond ： 01 06 51 01 00 01 09 36

Slave abnormal respond： 01 86 04 43 A3

3.4 Write multiple Registers (0x10)

(1) Host query command format：

Parameter	Length	Description
Slave address	1 byte	1~247
Function code	1 byte	0x10
Register Start address	2 byte	0x0000~0xFFFF
Register Number	2 byte	1~122
Byte number	1 byte	Register Number * 2
Register value	2 ~244 byte	
CRC code	2 byte	

(2) Slave normal respond：

Parameter	Length	Description
Slave address	1 byte	1~247
Function code	1 byte	0x10
Register Start address	2 byte	0x0000~0xFFFF
Register Number	2 byte	1~122
CRC code	2 byte	

(3) Slave abnormal respond：

Parameter	Length	Description
Slave address	1 byte	1~247
Function code	1 byte	0x90
Abnormal code	1 byte	refer"AbnormalCodeTable"
CRC code	2 byte	

(4) Example：

    Host query command ： 01 10 30 00 00 04 08 07 E1 01 01 00 00 00 00 7B 73

    Slave normal respond ： 01 10 30 00 00 04 CE CA

Slave abnormal respond： 01 90 02 CD C1

4 Error Code Table1（0x101F）

Notice type: input or output error;

Fault type: inverter error

Bit	Description
0	Grid over voltage
1	Grid under voltage
2	Grid absent
3	Grid over frequency
4	Grid under frequency
5	PV over voltage
6	PV insulation abnormal
7	Leakage current abnormal
8	Inverter in power limit state
9	Internal power supply abnormal
10	PV string abnormal
11	PV under voltage
12	PV irradiation weak
13	Grid abnormal
14	Arc fault detection
15	Grid over mean voltage

5 Error Code Table2(0x101E)

Bit	Description
0	Inverter over dc-bias current
1	Inverter relay abnormal
2	Remote off
3	Inverter over temperature
4	GFCI abnormal
5	PV string reverse
6	System type error
7	Fan abnormal
8	Unbalance Dc-link voltage
9	Dc-link over voltage
10	Internal communication error
11	Software incompatibility
12	Internal storage error
13	Data inconsistency
14	Inverter abnormal
15	Boost abnormal

6 Error Code Table3(0x1020)

Bit	Description
0	Reserved
1	Logger/E-Display EEPROM fail
2	Arc fault detection
3	Single tracker detect warning(PID device abnormal)
4	AFCI lost
5	Data logger lost
6	Meter lost
7	Inverter lost
8	Grid N abnormal
9	Surge Protection Devices (SPD) defective
10	Parallel ID warning
11	Parallel SYN signal warning
12	Parallel BAT abnormal
13	Parallel GRID abnormal
14	GEN voltage abnormal
15	Reserved

7 Error Code Table4(0x2013)

Bit	Description
0	Battery absent
1	Battery over voltage
2	Battery under voltage
3	Battery discharger over current
4	Battery over temperature
5	Battery under temperature
6	Neutral live wire reversed
7	Back up output voltage abnormal
8	Communication error (Inverter-BMS)
9	Internal communication loss(E-M)
10	Internal communication loss(M-D)
11	Dcdc abnormal
12	Back up over dc-bias voltage
13	Back up short circuit
14	Back up over load
15	Reserved

8　Inverter Mode Table

Value	Mode
0x00	Initial mode
0x01	Standby mode
0x03	OnGrid mode
0x04	OffGrid mode
0x05	Fault mode
0x09	Shutdown mode

9　Abnormal code Table

Abnormal code	Description
01	Indicate that function code is not expected code of 0x03, 0x06, 0x10
02	Indicate that read or write register number is too large
03	Indicate that read or write register address is out of range
04	Indicate that read or write register value is out of limit or the register is forbidden to write

10 Regulation code Table

Code	Description
0x0001	AU (Australia AS/NZS 4777.2/.3)
0x0002	DE (Germany VDE 0126-1-1/A1)
0x0003	TW (Taiwan TW GRID)
0x0004	DE (Germany VDE-AR-N 4105)
0x0005	JP (Japan JETGR0002-1-2.0)
0x0006	IT (Italy CEI 0-21)
0x0007	SE (Sweden SWEDEN Grid)
0x0008	UK (British G98)
0x0009	UL (USA UL)
0x000A	TL (Thailand PEA)
0x000B	SE (Sweden SWEDEN GRID) 2007
0x000C	NL (Netherlands EN50549-1 2019)
0x000D	TL (Thailand MEA)
0x000E	CN (China NB/T 32004)
0x000F	IND（India IEC61727）
0x0010	AU（Australia AS/NZS 4777.2:2015）
0x0011	NZ（Australia AS/NZS 4777.2:2015）
0x0012	MX（Mexico IEEE1547）
0x0013	UA (Ukraine VDE-AR-N 4105.)
0x0014	TW (Taiwan CNS 15382:2018)
0x0015	DE (Germany VDE0126-1-1/08.13)
0x0016	BR (Brazil ABNT NBR16149 2013)
0x0017	CZ (Czech EN 50160)
0x0018	UK (Britain G99 Type A)

0x0019	PT (Portugal EN50438)
0x001A	ES (Spain RD1699 / RD413)
0x001B	ES (Spain RD661 / PO12.2)
0x001C	IT (Italy CEI 0-21 ACEA)
0x001D	DE (Germany VDE-AR-N 4105:2018)
0x001E	BR (Brazil IEC61727)
0x001F	EU (European EN50549-1:2019)
0x0020	BE (Belgium C10/11)
0x0021	PL (Poland EN50438 2013)
0x0022	DE (Germany VDE4110:2018)
0x0023	EU (European EN50549-2:2019)
0x0024	IT (Italy CEI 0-16)
0x0025	ZA (South Africa NRS097-2-1)
0x0026	GR (Greek VDE0126_Continent)
0x0027	GR (Greek VDE0126_Islands)
0x0028	JO (Jordan IRR-DCC MV 2015)
0x0029	ES (Spain UNE206007 / UNE206006)
0x002A	AU(Australia AS4777.2:2015 South Area)
0x002B	UK (Britain G99 Type B)
0x002C	JO (Jordan IRR-TIC 2015)
0x002D	CZ (Czech EN50549-1)
0x002E	AT (Austria TOR TypeA)
0x002F	CY (Cyprus 2019)
0x0030	MX (Mexico IEEE1547 : 2014)
0x0031	CL (Chile 2021)
0x0032	FR (法國 UTE C15-712-1)
0x0033	CH (瑞士 NA/EEA A2)
0x0034	CH (瑞士 NA/EEA B2)
0x0035	FR (法國 UTE C15-712-1 Island 50Hz)
0x0036	FR (法國 UTE C15-712-1 Island 60Hz)
0x0037	FI (芬蘭 VJV Type A)
0x0038	FI (芬蘭 VJV Type B)
0x0039	NO (挪威 EN50549-1)
0x003A	PL (波蘭 NC RFG Type A)
0x003B	PL (波蘭 NC RFG Type B)
0x003C	BE (比利时 C10/11 MV)
0x003D	AT (奧地利 TOR Type B)
0x003E	IL (以色列 IS 4777)
0x003F	DK1 (西丹麥 Type A & B LV)
0x0040	DK1 (西丹麥 Type B MV)
0x0041	DK2 (東丹麥 Type A & B LV)
0x0042	DK2 (東丹麥 Type B MV)
0xFFFF	Not defined

11 Notice

Notice	Description
1	Only support 3 phase machine, register 0x1A48 = 3
2	The unit of CN (NB/T 32004) regulation code (0x5101=0x0E) is 10ms. The unit of other regulation codes is 1ms.
3	