

GoodWe Modbus Protocol Hybrid

For ES/EM/SBP Series Ver 2.8

UPDATED ON MAR 25th ,2022



Ver.	Date	Modification	Prepared by	Approved by
1				
1.1	20171030	Add register 0x0560-0x059C	Xu	
1.2	20171103	Add register 0x0535-0x0543	Xu	
1.3	20171110	Adjust the order of address 0x561-0x577	Xu	
1.4	20171222	add self-test register 0x7100-0x7118 , 0x059E 0x59F	Xu	
1.5	20180112	Add DSP and ARM internal edit version 0x229-0x22E	Xu	
		Add E-Total-PV register 0x52D-0x52E		
1.6	20180323	Add register 0x0547~0x054D	Xu	
1.7	20180531	Delete 0x229-0x22E	LS	Xu
		Add 0x229~0x22B , 0x5A0~0x5A1 , 0x7119		
		Add 0x200~0x207 and 0x210~0x214 Write Function		
1.8	20180614	Add 0x6000~0x601C meter data	LS	Xu
1.9	20181123	ADD 0x05A2~0x05A5	LS	Xu

2	20190923	ADD register 0x0600	LS	Xu
		ADD register 0x0700~0x0710		
		ADD register 0x0780~0x07FF		
		ADD register 45200~45509		
		ADD register 47010		
		ADD Table8-6 (register 0x050F Inverter Warning Code)		
2.1	20191114	Correct Table error	LS	Xu
2.2	20191202	1.Table association error correction	LS	Xu
		2.Add 0x05A7 ~ 0x05A8 registers		
2.3	20191211	Add 0x711A0x711B registers(cei-021:27.s2)	LS	xu
2.4	20191221	Add 35250~35261 registers.	Ls	xu
		Add Table 8-30, Table 8-31, Table 8-32.		
		Modify the under voltage lower limit range to 1V.		
2.5	20200220	Add Bit 16 ~Bit 19 Error Message in Table 8-8		
		Change Mode code description in Table 8-11		
		Add Explanation in Table 8-14		
2.6	20210318	Add Explanation		
2.7	20211014	Add Explanation		
2.8	20220325	Add register , update table 9-4,9-5		

1.PROTOCOL DESCRIPTION

This is a map document of standard MODBUS RTU protocol for only GoodWe energy storage inverters compatible with LV battery – ES, EM, SBP,ESA,BP series.

Inverter Address: Can be assigned from 1~247. 247 is factory default assignment.

Communication baud rate: The default baud rate is 9600 bps, which is adjustable up to 38400 bps

Function Code:

03H: Read Operation (NOTE: can read more than one registers at once)

10H: Write Operation (NOTE: All data support single write, the same background color can be written continuously.)

CRC Code Verification

CRC multinomial : $X^{16}+X^{15}+X^2+1$

CRC verification covers first byte to the last byte before CRC data.

Refer to chapter 11 to implement CRC verification

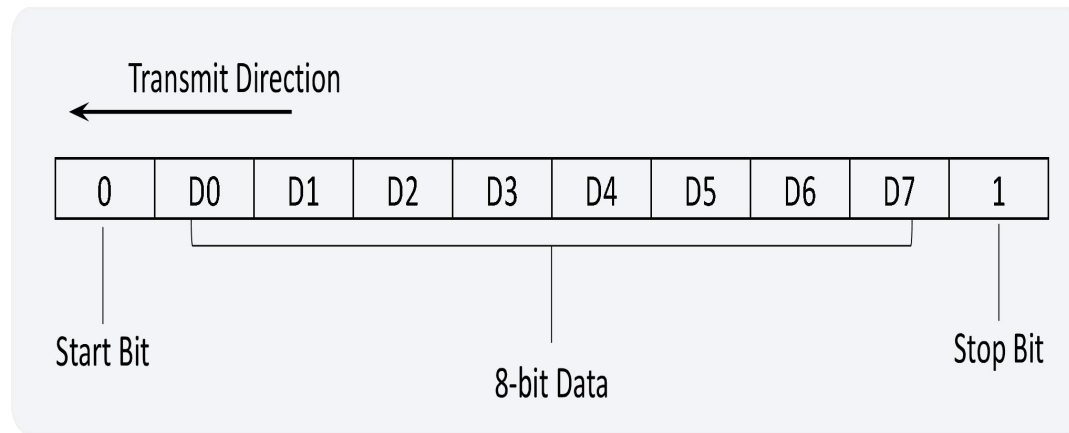
Character Explanation :

INT16U: Unsigned Integer; INT16S: Signed Integer; INT32U: Long Integer ; INT8U: Byte

R----Read Only; W----Write Only; R/W----Read and Write

Byte Format:

Every byte consists of one start bit, eight-bit data and one stop bit, 10 bit in total. The byte transmit sequence is described as below. D0 is the lowest bit of data and D7 is the highest bit of data.



Communication Data Format:

Data is transmitted as word or double word format.

Data Type	Amount of	Amount of Byte	Description
Short integer	1	1	
Integer	1	2	High byte first, and low byte follow
Long integer	2	4	As 2 words, high word first and low word follow

2. Data Frame Format

2.1 Read Register (Function Code: 03H)

2.1.1 Data Frame Format from AP

Data NO	Content	Sample	Description
1	Inverter Address	1	Communication address (1-247)
2	03H	03H	Function code
3	High byte of first register	00H	Address of first register
4	Low byte of first register	01H	
5	High byte of amount	00H	Amount of register
6	Low byte of amount	02H	
7	High byte of CRC16 code	95H	CRC Code of verification
8	Low byte of CRC16 code	CBH	

2.1.2 Data Frame Format from Inverter (When OK)

Data NO	Content	Description
1	Inverter Address	Communication address (1-247)
2	03H	Function code
3	Amount of byte of data (2N)	Amount of byte of data
4	High byte of data of first register	High byte of first register
5	Low byte of data of first register	Low byte of first register
...	...	...
2N+2	High byte of data of the Nth register	High byte of the Nth register
2N+3	Low byte of data of the Nth register	Low byte of the Nth register
2N+4	High byte of CRC16 verification code	High byte of CRC16 verification code
2N+5	Low byte of CRC16 verification code	Low byte of CRC16 verification code

2.1.3 Data Frame Format from Inverter (When NG)

Data NO	Content	Description
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1	Inverter Address	Communication Address (1-247)
2	83H	Function code
3	02H	Fault Code
4	High byte of CRC16 verification code	High byte of CRC16 verification code
5	Low byte of CRC16 verification code	Low byte of CRC16 verification code

2.2 Set Register (Function code: 10H)

2.2.1 Data Frame Format from AP

Data NO	Content	Sample	Description
1	Inverter Address	1	Communication Address (1-247)
2	10H	10H	Function Code
3	High byte of data of first register	00H	Address of register: 0000H
4	Low byte of data of first register	00H	
5	High byte of amount of registers	00H	Amount of registers: 0001H
6	Low byte of amount of registers	01H	
7	Amount of bytes (N)	02H	
8	High byte of data	0AH	Data: 0AF0H
9	Low byte of data	F0H	
10	High byte of CRC16 verification code	A0H	CRC verification
11	Low byte of CRC16 verification code	B4H	

2.2.2 Data Frame Format from Inverter (when OK)

Data NO	Content	Sample	Description
1	Inverter Address	1	Communication Address (1-247)
2	10H	10H	Function Code: 10H
3	High byte of data of first register	00H	Address of register: 0000H
4	Low byte of data of first register	00H	
5	High byte of amount of registers	00H	Amount of registers: 01H
6	Low byte of amount of registers	01H	
7	High byte of CRC16 verification code	01H	CRC verification
8	Low byte of CRC16 verification code	C9H	

2.2.3 Data Frame Format from Inverter (when data is faulty)

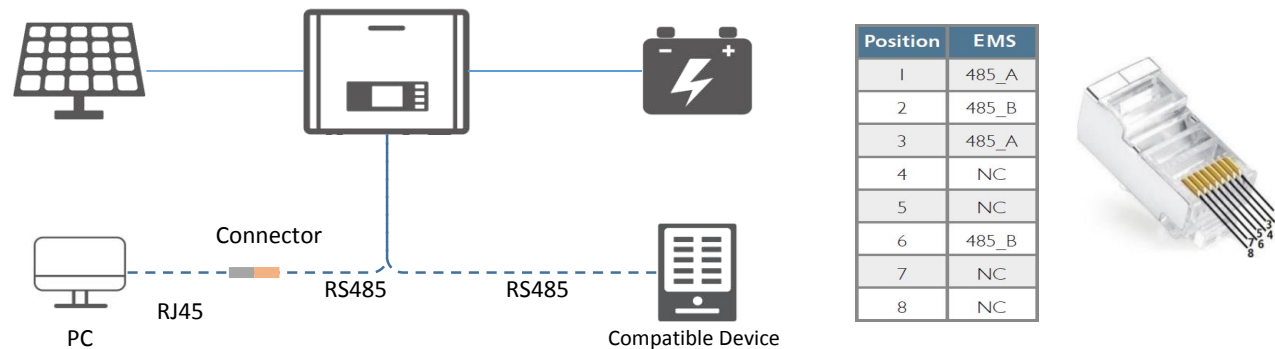
Data NO	Content	Description
1	Inverter Address	Communication Address (1-247)
2	10H	Function Code: 10H
3	02H	Fault Code
4	High byte of CRC16 verification code	CRC Verification Code
5	Low byte of CRC16 verification code	

2.2.4 Data Frame Format from Inverter (when address or amount of register is faulty)

Data NO	Content	Description
1	Inverter Address	Communication Address (1-247)
2	90H	Function Code
3	02H	Fault Code
4	High byte of CRC16 verification code	CRC Verification Code
5	Low byte of CRC16 verification code	

3.System Wiring Instruction

This is the basic wiring and instructions before starting reading interactive log between GoodWe



Solar inverter must be powered up by DC or AC power before it can communicate successfully to the compatible device.

To read the interactive log, the laptop has to be connected in parallel with compatible device by RS485 cable and a RS485-to-RJ45

4.Address and Property of Register

4.1 Read only Data Segment Registers

Address (Hex)	Name of Data	Content	Unit	Data Format	(R.W) Property	Data Range	Remarks
Hybrid Inverter Information Data							
0200~0207 (8)	Serial Number of Inverter			ASCII	R		ASCII code, 16 bytes
0208~0209 (2)	Nom_Vpv			ASCII	R		ASCII code, 4 bytes
020A~020C (3)	Firmware Version			ASCII	R		ASCII code, 6 bytes
0210~0214 (5)	Model Name of Inverter			ASCII	R		ASCII Code, 10 Bytes
0215~021A (6)	DSP Internal Firmware Ver			ASCII	R		Example '410-00000-00'
021B~0220 (6)	ARM Internal Firmware Ver			ASCII	R		Example '410-02000-00'
0221~0228 (8)	Manufacturer Info			ASCII	R		'GOODWE' = 'xxh xxh xxh xxh xxh xxh 20h 20h...20h'
0229	Firmware Version(0x16)			INT16U	R		0x01 0x81, Index :0x16
022A	ARM Updata Result			INT16U	R		0x00: normal 0x01: Bin file OK
022B	DSP Updata Result			INT16U	R		0x02: Update Success 0x14: Bin file NG 0x15 :Update Fail

Addr. (Hex)	Name of Data	Content	Unit	Data Format	(R.W)	Data Range	Remarks
Hybrid Inverter Running Data							
0500	Vpv1		0.1V	INT16U	R		Real time PV voltage of MPPT1
0501	Ipv1		0.1A	INT16U	R		Real time PV current of MPPT1
0502	PV1 Mode		NA	INT16U	R		PV1 Module work mode, see Table 8-4
0503	Vpv2		0.1V	INT16U	R		Real time PV voltage of MPPT2
0504	Ipv2		0.1A	INT16U	R		Real time PV current of MPPT2
0505	PV2 Mode		NA	INT16U	R		PV2 Module work mode, see Table 8-4
0506	Vbattery		0.1V	INT16U	R		Real time battery voltage
0507	TBD		NA	INT16U	R		
0508	BMS Status		NA	INT16U	R		BMS Status, see Table 8-5
0509	BMS Pack Temperature		0.1℃	INT16U	R		Battery Pack Temperature (From BMS)
050A	Ibattery		0.1A	INT16U	R		Real time battery current
050B	BMS Charge I _{max}		1A	INT16U	R		Battery charge current limit(From BMS)
050C	BMS Discharge I _{max}		1A	INT16U	R		Battery discharge current limit(From BMS)
050D	BMS Error Code		NA	INT16U	R		see Table 8-8

050E	SOC		1%	INT16U	R		Battery SOC(From BMS)
050F	Inverter Warning Code		NA	INT16U	R		Warning Code, see Table 8-6
0510	TBD		NA	INT16U	R		
0511	BMS SOH		1%	INT16U	R		Battery SOH(From BMS)
0512	Battary Mode		NA	INT16U	R		Battery work mode, Table 8-9
0513	BMS Warning Code H		NA	INT16U	R		refer to Table 8-8
0514	BMS Warning Code L		NA	INT16U	R		refer to Table 8-8
0515	Meter Status		NA	INT16U	R		1: OK, 0: NG
0516	Vgrid		0.1V	INT16U	R		Grid voltage
0517	Igrid		0.1A	INT16U	R		Grid current(on-grid port)
0518	Pgrid		1W	INT16S	R		If meter communication is ok ,this register is Meter Power. If meter communication failure, it is inverter on-grid outout Power. Positive means feed to grid, negative means buy power from grid.
0519	Fgrid		0.01Hz	INT16U	R		Grid Frequency
051A	Grid Mode		NA	INT16U	R		Grid mode, see Table 8-10
051B	Vload		0.1V	INT16U	R		Inverter back-up output voltage
051C	Iload		0.1A	INT16U	R		Inverter back-up output current
051D	OnGrid Load Power		1W	INT16U	R		Ongrid Load Power

051E	Fload		0.01Hz	INT16U	R		Inverter back-up output Frequency
051F	Load Mode		NA	INT16U	R		Load work mode, Table 8-11
0520	Work Mode		NA	INT16U	R		Storage Inverter work mode, see Table 8-12
0521	Temperature		0.1 °C	INT16U	R		Inverter internal temperature
0522	Error Message		NA	INT16U	R		Failure description for status 'failure' Table 8-2
0523	Error Message		NA	INT16U	R		Failure description for status 'failure' Table 8-2
0524	E-Total H		0.1KW.Hr	INT16U	R		Total Feed Energy to grid
0525	E-Total L		0.1KW.Hr	INT16U	R		Total Feed Energy to grid
0526	h-Total H		Hr	INT16U	R		Total feeding hours
0527	h-Total L		Hr	INT16U	R		Total feeding hours
0528	E-Day		0.1KW.Hr	INT16U	R		Export Energy to grid today
0529	E-Load-Day		0.1KW.Hr	INT16U	R		Energy of load day
052A	E-Total-Load H		0.1KW.Hr	INT16U	R		High Byte of total load Energy
052B	E-Total-Load L		0.1KW.Hr	INT16U	R		Low Byte of total load energy
052C	TotalPower		1W	INT16S	R		Total Power of inverter
052D	E-PV-Total-H		0.1KW.Hr	INT16U	R		High Byte of total PV Energy
052E	E-PV-Total-L		0.1KW.Hr	INT16U	R		Low Byte of total PV Energy
052F	Grid in-out flag		NA	INT16U	R		Inverter export to Grid or get power from Grid, see Table 8-13
0530	Back-Up Load Power		1w	INT16U	R		Back-Up Load Power
0531	MeterPowerFactor		1%	INT16S	R		
0532	DiagStatusH		NA	INT16U	R		Refer Table 8-14
0533	DiagStatusL		NA	INT16U	R		Refer Table 8-14
0534	DRMStatus		NA	INT16U	R		Refer Table 8-15,only for Austrlia

0535	E-Total-Sell H		NA	float	R		cumulative power capacity sold to grid revealed by meter, High Byte in the upfront
0536	E-Total-Sell L		NA	float	R		
0537	E-Total-Buy H		NA	float	R		cumulative power capacity buy from grid revealed by meter, High Byte in the upfront
0538	E-Total-Buy L		NA	float	R		
053C	VgridUo		0.1V	INT16U	R		Grid Uo voltage,only for Japan
053D	IgridUo		0.1A	INT16U	R		Grid Uo current,only for Japan
053E	VgridWo		0.1V	INT16U	R		Grid Wo voltage,only for Japan
053F	IgridWo		0.1A	INT16U	R		Grid Wo current,only for Japan
0540	E-BatteryCharge		0.1Kwh	INT16U	R		Cumulative Charging Energy H
0541	E-BatteryCharge L		0.1Kwh	INT16U	R		Cumulative Charging Energy L
0542	E-BatteryDischarge H		0.1Kwh	INT16U	R		Cumulative Discharging Energy H
0543	E-BatteryDischarge L		0.1Kwh	INT16U	R		Cumulative Discharging Energy L
0544	Ppv1		1w	INT16U	R		Real time Power of MPPT1
0545	Ppv2		1w	INT16U	R		Real time Power of MPPT2
0547	BatteryPower		1W	INT16U	R		Battery Power,positive means battery discharge to the inverter;negative means charge the battery

0548	INT E-Total-Sell H		0.1Kwh	INT16U	R	0- 4294967295	cumulative power capacity sold to grid revealed by meter, High Byte positioned in the upfront
0549	INT E-Total-Sell		0.1Kwh	INT16U	R		
054A	INT E-Total-Buy H		0.1Kwh	INT16U	R	0- 4294967295	cumulative power capacity buy from grid revealed by meter, High Byte positioned in the upfront
054B	INT E-Total-Buy		0.1Kwh	INT16U	R		
054C	E-BatCharge- Today		0.1Kwh	INT16U	R	0-65535	Daily Cumulative Charging Energy
054D	E- BatDischarge-		0.1Kwh	INT16U	R	0-65535	Daily Cumulative Discharging Energy

GoodWe Smart Meter Data Address							
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Addr. (HEX)	Name of Data	Content	Unit	Data Format	(R.W)	Data Range	Remarks
6000	ACRMeterType			INT16U	R	0~2	0: Unknow 1: ACR 1Phase 2 : ACR 3Phase
6001	MeterStatus			INT16U	R	0~1	0: NG 1: OK
6002	Phase A voltage		0.1V	INT16U	R	0~32767	A-phase voltage in 3P meter /1P meter voltage
6003	Phase B voltage		0.1V	INT16U	R		B-phase voltage in 3P meter
6004	Phase C voltage		0.1V	INT16U	R		C-phase voltage in 3P meter
6005	Phase A current		0.01A	INT16U	R		A-phase current in 3P meter /1P meter current
6006	Phase B current		0.01A	INT16U	R		B-phase current in 3P meter
6007	Phase C current		0.01A	INT16U	R		C-phase current in 3P meter

6008	Phase A active power		1W	INT16S	R	-32766 ~32767	A-phase active power in 3P meter / 1P meter active power
6009	Phase B active power		1W	INT16S	R		B-phase active power in 3P meter
600A	Phase C active power		1W	INT16S	R		C-phase active power in 3P meter
600B	Total active power		1W	INT16S	R		Total active power
600C	Phase A reactive power		1Var	INT16S	R		A-phase Reactive power in 3P meter / 1P meter Reactive power
600D	Phase B reactive power		1Var	INT16S	R		B-phase reactive power in 3P meter
600E	Phase C reactive power		1Var	INT16S	R		C-phase reactive power in 3P meter
600F	Total reactive power		1Var	INT16S	R		Total reactive power
6010	Phase A apparent power		1VA	INT16S	R		A-phase apparent power in 3P meter / 1P meter apparent power
6011	Phase B apparent power		1VA	INT16S	R		B-phase apparent power in 3P meter
6012	Phase C apparent power		1VA	INT16S	R		C-phase apparent power in 3P meter
6013	Total apparent power		1VA	INT16S	R		Total apparent power

6014	Phase A power factor			INT16S	R	-99~100	A-phase PF in 3P meter / 1P meter power factor
6015	Phase B power factor			INT16S	R		B-phase PF in 3P meter
6016	Phase C power factor			INT16S	R		C-phase PF in 3P meter
6017	Total power			INT16S	R		Total power factor
6018	Frequency		0.01Hz	INT16U	R		Frequency
6019	E-Total-Sell H		w	float	R		Cumulative power capacity sold to grid revealed by meter. High Byte in the upfront
601A	E-Total-Sell L		w	float	R		
601B	E-Total-Buy H		w	float	R		Cumulative power capacity buy from grid revealed by meter. High Byte in the upfront
601C	E-Total-Buy L		w	float	R		
Address	Name of Data	Gain	Unit	Data Format	(R.W) Property	Data Range	Remarks
(Decimal)							
Function setting data address							
35250	ExtGridDetailedErrH	1	NA	U32	R	NA	Grid detailed fault display refer to Table 8-30
35252	ExtGridDetailedErrL	1	NA	U32	R	NA	
35254	ExtInvDetailedErrH	1	NA	U32	R	NA	Inverter detailed error display refer to Table 8-31
35256	ExtInvDetailedErrL	1	NA	U32	R	NA	
35258	ExtInvDetailedStatusH	1	NA	U32	R	NA	Inverter detailed status display refer to Table 8-32
35260	ExtInvDetailedStatusL	1	NA	U32	R	NA	

4.2. Read and Write Data Segment Registers

Addr. (Hex)	Name of Data	Content	Unit	Data Format	(R.W) Property	Data Range	Remarks
0000	Lowest Feeding PV Voltage		0.1V	INT16U	R/W	280v-600v	
0001	Reconnect Time		1s	INT16U	R/W	30s-300s	
0002	Low limit of Grid Voltage		0.1V	INT16U	R/W	110v-230v	
0003	High limit of Grid Voltage		0.1V	INT16U	R/W	230v-270v	
0004	Low limit of Grid Frequency		0.01Hz	INT16U	R/W	45hz-60hz	
0005	High limit of Grid Frequency		0.01Hz	INT16U	R/W	50hz-65hz	
0010	RTC date&time	Y /M		INT16U	R/W	13-99/1-12	
0011		D /Hr.		INT16U	R/W	1-31/0-23	
0012		Min/Sec		INT16U	R/W	0-59/0-59	
0100	Range of real power adjust		1%	INT16U	W	0-100	0%~100% of rated real power.If set 90%, the max inverter AC output is 90% of inverter rated power
0101	Range of reactive power adjust			INT16U	W	1-20,80-100	1-20 as 0.99-0.8 lagging,80-100 as leading 0.80-1 Table 9- 3

Addr. (Hex)	Name of Data	Cont	Unit	Data Format	R/W	Range of Data	Remarks
Setting register							
0556	BackUpEnable		NA	INT16U	R/W	0-1	Backup Output on(1 :on 0 :off) Default setting is 1
0557	OffGridAutoCharge		NA	INT16U	R	0-1	PV Offgrid auto charge(1 :on 0 :off)
0558	EnableMPPT4Shado		NA	INT16U	R/W	0-1	Shadow scan enable (1: on, 0: off)
0559	FeedPowerEnable		NA	INT16U	R/W	0-1	Feed power to grid (0 : yes 1 : no),After enable this function,please set the feed power (0567)
055B	LeadBatCapacity		Ah	INT16U	R/W	50-2000	Lead acid batt capacity (50-2000Ah)
055C	BattChargeVoltMax		0.1V	INT16U	R/W	500-600	Battery charge volt setting
055D	BattChargeCurrMax		0.1A	INT16U	R/W	0-1000	Battery charge curr setting
055E	BattDisChgCurrMax		0.1A	INT16U	R/W	0-1000	Battery discharge curr setting
055F	BattVoltUnderMin		0.1V	INT16U	R/W	400-480	Battery volt under setting
0560	BattSOCUnderMin		1%	INT16U	R/W	0-100	Battery SOC under setting
0561	BatActivePeriod		1 Min	INT16U	R/W	0: Off	Battery active (0 :Off, 1-1440mins :on)
						1-1440mins :on	
0562	RPControlPara		NA	INT16U	R/W	-80~+80	Power Factor Setting Table 9-3
0563	BattFloatVolt		0.1V	INT16U	R/W	500-600	Battery float charge volt setting
			0.1A	INT16U	R/W	0-1000	Battery float charge curr setting
0565	BattToFloatTime		1 min	INT16U	R/W	10-30	Battery CV charge Time
0566	BattTypeIndex		NA	INT16U	R/W	0-255	Battery manufactor index setting Table 9-5

0567	FeedPowerPara		1w	INT16U	R/W	0-5000	Feeding power limit
0568	AutoStartBackup		NA	INT16U	R/W	0-1	Offgrid Auto startup(1 :on 0 :off)
0569	StopSocProtect		NA	INT16U	R/W	0-1	No soc protect(1 :on, 0 :off)
056A	DCVoltOutput/ KeepBattVoltOn		NA	INT16U	R/W	0-1	DC Ouput(1 :on, 0 :off) No battery charge voltage on
056B	BattAvgChgVolt		0.1v	INT16U	R/W	500-600	Battery maintain charge voltage
056C	BatAvgChgHours		1 Hour	INT16U	R/W	1-5000	Battery maintain charge cycle
056D	AS477Parameters		NA	INT16U	R		Reserved
056E	EMSPowerMode		NA	INT16U	R/W		Table 9-2
056F	EMSPowerSet		1w	INT16U	R/W		Table 9-2
0570	Reserved		NA	INT16U	R		BMS protocol config status
0571	NoGridChargeEnable		NA	INT16U	R	1-2	Charge battery when grid is outage (1:on, 2:off)
0572	DisChgWithPVEnable		NA	INT16U	R	1-2	Discharge with PV enable (1: on, 2: off)
0573	Reserved		NA	INT16U	R	0-1	
0574	AppModelIndex		NA	INT16U	R/W		
0575	GridWaveCheckLevel		NA	INT16U	R/W	0-2	0: High 1: low, 2: close
0576	MeterCheckValue		1w	INT16U	R/W	0-60000	
0577	RapaidCutOff		NA	INT16U	R/W	0-1	0 :off, 1 :on
0578	GridVoltQualit		0.1V	INT16U	R/W	2300-3000	Grid quality volt mov avg in 9min
0579	GridVoltHighS2		0.1V	INT16U	R/W	2300-3000	Grid over volt value in state 2
057A	GridVoltLowS2		0.1V	INT16U	R/W	10-2300	Grid under volt value in state 2
057B	GridVoltHighS2Time		0.02S	INT16U	R/W	0-65535	Grid over volt time in state 2
057C	GridVoltLowS2Time		0.02S	INT16U	R/W	0-65535	Grid under volt time in state 2

057D	GridVoltHighS1		0.1V	INT16U	R/W	2300-3000	Grid over volt value in state 1
057E	GridVoltLowS1		0.1V	INT16U	R/W	10-2300	Grid under volt value in state 1
057F	GridVoltHighS1Time		0.02S	INT16U	R/W	0-65535	Grid over volt time in state 1
0580	GridVoltLowS1Time		0.02S	INT16U	R/W	0-65535	Grid under volt time in state 1
0581	GridFreqHighS2		0.01Hz	INT16U	R/W	5000-5500	Grid over freq value in state 2
0582	GridFreqLowS2		0.01Hz	INT16U	R/W	4500-5000	Grid under freq value in state 2
0583	GridFreqHighS2Time		0.02S	INT16U	R/W	0-65535	Grid over freq time in state 2
0584	GridFreqLowS2Time		0.02S	INT16U	R/W	0-65535	Grid under freq time in state 2
0585	GridFreqHighS1		0.01Hz	INT16U	R/W	5000-5500	Grid over freq value in state 1
0586	GridFreqLowS1		0.01Hz	INT16U	R/W	4500-5000	Grid under freq value in state 1
0587	GridFreqHighS1Time		0.02S	INT16U	R/W	0-65535	Grid over freq time in state 1
0588	GridFreqLowS1Time		0.02S	INT16U	R/W	0-65535	Grid under freq time in state 1
0589	GridVoltRecoverHigh		0.1V	INT16U	R/W	2300-3000	Grid volt recover high value
058A	GridVoltRecoverLow		0.1V	INT16U	R/W	1600-2300	Grid volt recover low value
058B	GridVoltRecoverTime		0.02S	INT16U	R/W	0-65535	Grid volt recover time value
058C	GridFreqRecoverHigh		0.01Hz	INT16U	R/W	5000-5500	Grid freq recover high value
058D	GridFreqRecoverLow		0.01Hz	INT16U	R/W	4500-5000	Grid freq recover low value
058E	GridFreqRecoverTim		0.02S	INT16U	R/W	0-65535	Grid freq recover time value
058F	PointBValue		1%	INT16U	R/W	30-80	Reactive curve point B PF(30-80)
0590	PointCValue		0.01	INT16U	R/W	90-100	Reactive curve point C PF(90-100)
0591	GridLimitByVolStartV		0.1V	INT16U	R/W		Grid limit start volt (JAPAN)
0592	GridLimitByVolStartP		1%	INT16U	R/W		Grid limit start percent (JAPAN)

0593	GridLimitByVolSlope		1%/V	INT16U	R/W		Grid limit slope (JAPAN)
0594	ActiveCurveVolt		0.1v	INT16U	R/W	2200-2700	Reactive curve start voltage
0595	DesactiveCurveVolt		0.1v	INT16U	R/W	1980-2600	Reactive curve stop voltage
0596	EnableCurve			INT16U	R/W	1-2	Enable CEI voltage vs reactive curve, 1.off ; 2,on
0597	BackupStartDly		1min	INT16U	R/W		Backup Start Delay
0598	RecoverTimeEE		1%/min	INT16U	R/W	5-100	Recover speed
0599	SafetyCountry			INT16U	R/W		0:Italy Table 9-4
059A	Iso Limit		10ko	INT16U	R	0-300	ISO Limit
059B	BatBMSCurrLmtCoff		1%	INT16U	R/W	1-100	BMS current limit coefficient
059C	wMeterConnectCheckFlag			INT16U	R/W	0-1	1 :Start Meter check, 0 :Stop check
059D	MeterConnectStatus			INT16U	R	0-3	Meter Status : 1: OK, 2: Reverse, 3: CT Error, 0: NG
059E	UpsStdVoltType			INT16U	R/W	0-3	0:208V, 1:220V, 2:240V,3 :230V
059F	FunctionStatus			INT16U	R		Table 9-1
05A0	BattOfflineVoltUnderMin		0.1v	INT16U	R/W	400-480	Offline Battery volt under setting
05A1	BattOfflineSOCUnderMin		1%	INT16U	R/W	0-100	Offline Battery SOC under setting
05A2	OnlyNightDischarge			INT16U	R/W	1-2	1: Allow battery to discharge when PV is present, 2: Prohibit battery discharge when PV is present Only for BP Series
05A3	BMSProtocolCode			INT16U	R/W	0-255	Table 9-6
05A5	OfflineMPPTScanEnable			INT16U	R/W	0~1	Off-grid Mppt scan. 0:OFF, 1:ON
05A6	PVextendenable			INT16U	R/W	0~1	PV power expansion 0 :OFF, 1 :ON
05A7	PERelayCheckEn			INT16U	R/W	0~1	PE Relay check Enable
05A8	BatteryModePVCharge			INT16U	R/W	0~1	Off-grid mode, battery be charged by PV when battery is low. 0: OFF, 1: ON

0600	Control ES WiFi LED (For specific customers)			INT16U	W	[0~255]	0:NA, 1:Blink1, 2:Blink2, 3:Blink4, 0xFE:ON (for specific user)
Address (Hex)	Name of Data	Content	Unit	Data Format	(R.W)	Data Range	Remarks
Using 0x0700~0x0710 address segment registers will disable the use of registers 0x0550~0x0555							
0x0700	ClrAllEcoEnable			INT16U	W	[1,1]	Write 1 value to clear all Eco enable
0x0701	StartTime_1	Hour/Min	HM	INT16U	R/W	[0,23],[0,59]	hh:mm
0x0702	EndTime_1	Hour/Min	HM	INT16U	R/W	[0,23],[0,59]	hh:mm
0x0703	BatPowerPercent_1		%	INT16S	R/W	[-100,100]	%Pn
0x0704	WorkWeek_1			INT16U	R/W		The high byte FF indicates enable, and low byte 0~6 bit indicates Sunday to Saturday the entire week.
0x0705	StartTime_2	Hour/Min	HM	INT16U	R/W	[0,23],[0,59]	hh:mm
0x0706	EndTime_2	Hour/Min	HM	INT16U	R/W	[0,23],[0,59]	hh:mm
0x0707	BatPowerPercent_2		%	INT16S	R/W	[-100,100]	% Pn
0x0708	WorkWeek_2			INT16U	R/W		The high byte FF indicates enable, and low byte 0~6bit indicates Sunday to Saturday the entire week.
0x0709	StartTime_3	Hour/Min	HM	INT16U	R/W	[0,23],[0,59]	hh:mm
0x070A	EndTime_3	Hour/Min	HM	INT16U	R/W	[0,23],[0,59]	hh:mm
0x070B	BatPowerPercent_3		%	INT16S	R/W	[-100,100]	% Pn
0x070C	WorkWeek_3			INT16U	R/W		The high byte FF indicates enable, and low byte 0~6bit indicates Sunday to Saturday the entire week.
0x070D	StartTime_4	Hour/Min	HM	INT16U	R/W	[0,23],[0,59]	hh:mm
0x070E	EndTime_4	Hour/Min	HM	INT16U	R/W	[0,23],[0,59]	hh:mm
0x070F	BatPowerPercent_4		%	INT16S	R/W	[-100,100]	% Pn
0x0710	WorkWeek_4			INT16U	R/W		The high byte FF indicates enable, and low byte 0~6bit indicates Sunday to Saturday the entire week.

Addr (Hex)	Name of Data	Cont.	Unit	Format	(R.W)	Range	Remarks
For RS485 Communication between BMS and inverter							
BMS information does not support single register writes, and complete packets must be written consecutively							
0x0780	BMSVersion		NA	U16	RW	NA	Any value, only for identification (must be sent)
0x0781	BattStrings		Pcs	U16	RW	[1,9]	Battery series connection modules
0x0782	wBMSBatChargeVMa		0.1V	U16	RW	[0,5400]	BMS Charge limiting voltage
0x0783	wBMSBatChargeIMa		1A	U16	RW	[0,1500]	BMS Charge limiting current
0x0784	wBMSBatDisCharge VMin		0.1V	U16	RW	[0,5400]	BMS Discharge limiting voltage
0x0785	wBMSBatDisChargeI Ma x		1A	U16	RW	[0,1500]	BMS Discharge limiting current
0x0786	wBMSBatVoltage		0.1V	U16	RW	NA	BMS Battery voltage
0x0787	wBMSBatCurrent		0.1A	U16	RW	NA	BMS Battery current
0x0788	wBMSBatSOC		%	U16	RW	[0,1000]	SOC
0x0789	wBMSBatSOH		%	U16	RW	[0,1000]	SOH
0x078A	wBMSBatTemperatur		0.1℃	U16	RW	NA	Battery temperature
0x078B	BMSWarningCodeH			U16	RW	NA	refer to Table 8-8
0x078C	BMSWarningCodeL			U16	RW	NA	
0x078D	BMSAlarmCodeH			U16	RW	NA	refer to Table 8-8
0x078E	BMSAlarmCodeL			U16	RW	NA	
0x078F	BMSStatus			U16	RW	NA	refer to Table 8-22
0x0790~0 x079F	Reserved						
0x07A0	BattStartChgSoc		%	U16	RW	[0,100]	Battery SOC forced charging start point
0x07A1	BattStopChgSoc		%	U16	RW	[0,100]	Battery SOC forced charging end point
0x07A2	GoodWeActiveEnable			U16	RW	[0, 1]	Goodwe default lithium battery activation 1: Allow
0x07A3~0 x07AF	Reserved						
0x07B0	BMS_Reserved1	NA	NA	U16	RO	[0,65535]	BMS Pass Information1

0x07B1	BMS_Reserved2	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation2
0x07B2	BMS_Reserved3	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation3
0x07B3	BMS_Reserved4	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation4
0x07B4	BMS_Reserved5	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation5
0x07B5	BMS_Reserved6	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation6
0x07B6	BMS_Reserved7	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation7
0x07B7	BMS_Reserved8	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation8
0x07B8	BMS_Reserved9	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation9
0x07B9	BMS_Reserved10	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation10
0x07BA	BMS_Reserved11	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation11
0x07BB	BMS_Reserved12	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation12
0x07BC	BMS_Reserved13	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation13
0x07BD	BMS_Reserved14	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation14
0x07BE	BMS_Reserved15	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation15
0x07BF	BMS_Reserved16	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation16
0x07C0	BMS_Reserved17	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation17
0x07C1	BMS_Reserved18	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation18
0x07C2	BMS_Reserved19	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation19
0x07C3	BMS_Reserved20	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation20
0x07C4	BMS_Reserved21	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation21
0x07C5	BMS_Reserved22	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation22
0x07C6	BMS_Reserved23	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation23
0x07C7	BMS_Reserved24	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation24
0x07C8	BMS_Reserved25	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation25
0x07C9	BMS_Reserved26	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation26
0x07CA	BMS_Reserved27	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation27
0x07CB	BMS_Reserved28	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation28
0x07CC	BMS_Reserved29	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation29
0x07CD	BMS_Reserved30	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation30
0x07CE	BMS_Reserved31	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation31
0x07CF	BMS_Reserved32	NA	NA	U16	RO	[0,65535]	BMS Pass Infomation32

0x07D0~0x07FF	Reserved						
Registers For CEI0-21 Auto-Test on Energy Storage Inverter (Italy Only)							
Address (Hex)	Name of Data	Cont.	Unit	Data Format	(R.W)	Range	Remarks
7100	Vac1		0.1V	INT16U	R		Phase L1 voltage
7101	Fac1		0.01Hz	INT16U	R		Phase L1 frequency
7102	Pac L		1W	INT16U	R		low Byte of Feeding power
7103	Work Mode		NA	INT16U	R		Work Mode Table 8-1
7104	Error Message H		NA	INT16U	R		Failure description for status 'failure' Table 8-2
7105	Error Message L		NA	INT16U	R		Failure description for status 'failure' Table 8-2
7106	Line1AvgFaultValue		0.1V	INT16U	R		59.S1 voltage fault value
7107	Line1AvgFaultTime		s	INT16U	R		59.S1 voltage fault time
7108	Line1VHighfaultValue		0.1V	INT16U	R		59.S2 voltage fault value
7109	Line1VHighfaultTime		ms	INT16U	R		59.S2 voltage fault time
710A	Line1VLowfaultValue		0.1V	INT16U	R		27.S1 voltage fault value
710B	Line1VLowfaultTime		ms	INT16U	R		27.S1 voltage fault time
710C	Line1FHighfaultValueCom		0.01Hz	INT16U	R		81>.S1 Frequency fault value
710D	Line1FhighfaultTimeCom		ms	INT16U	R		81>.S1 Frequency fault Time
710E	Line1FlowfaultValueCom		0.01Hz	INT16U	R		81<.S1 Frequency fault value
710F	Line1FlowfaultTimeC		ms	INT16U	R		81<.S1 Frequency fault Time
7110	Line1FHighfaultValue		0.01Hz	INT16U	R		81>.S2 Frequency fault value
7111	Line1FHighfaultTime		ms	INT16U	R		81>.S2 Frequency fault Time
7112	Line1FLowfaultValue		0.01Hz	INT16U	R		81<.S2 Frequency fault value
7113	Line1FLowfaultTime		ms	INT16U	R		81<.S2 Frequency fault Time
7114	SimVoltage		0.1V	INT16U	R		Simulate voltage
7115	SimFrequency		0.01Hz	INT16U	R		Simulate Frequency

7116	TestResult		NA	INT16U	R		0 (testing) /1(complete)
7117	SelftestStep		NA	INT16U	R/W		0~8
							1:Step59S1, 2:Step59S2, 3:Step27S1, 4:Step81>.S1, 5:Step81<.S1, 6:Step81>.S2, 7:Step81<.S2,
7118	Start Test		NA	INT16U	R/W		0 :(Stop), 1 :(Start)
7119	SetRemotesafety		NA	INT16U	W		Set under frequency threshold range for CEI safety regulations
							0: Disable, 1: 81 >.S2 1S&4S
							2: 81 >.S2 0.1S, 3: 81 >.S1
711A	Line1VlowfaultValueS		0.1V	INT16U	R		27.S2 voltage fault value
711B	Line1VlowfaultTimeS		ms	INT16U	R		27.S2 voltage fault time
Addr.	Name of Data	Gain	Unit	Data Form	(R.W)	Data Range	Remarks
decimal							
Grid safety module setting data address							
Note: Gain refers to value amplification factor (Eg. 231.5V, unit V, gain 10, actual read & write data 2315)							
36044	Meter software	1	NA	U16	RO		
45400	GridVoltHighS1	10	V	U16	RW	[600, 3000]	Grid over volt value in state 1
45401	GridVoltHighS1Time	1	periods	U16	RW	[1, 65535]	Grid over volt time in state 1
45402	GridVoltLowS1	10	V	U16	RW	[10, 3000]	Grid under volt value state 1
45403	GridVoltLowS1Time	1	periods	U16	RW	[1, 65535]	Grid under volt time in state 1
45404	GridVoltHighS2	10	V	U16	RW	[600, 3000]	Grid over volt value in state 2
45405	GridVoltHighS2Time	1	periods	U16	RW	[1, 65535]	Grid over volt time in state 2
45406	GridVoltLowS2	10	V	U16	RW	[10, 3000]	Grid under volt value state 2
45407	GridVoltLowS2Time	1	periods	U16	RW	[1, 65535]	Grid under volt time in state 2
45408	GridVoltQualit	10	V	U16	RW	[600, 3000]	Grid qualit volt mov avg in 9min
45409	GridFreqHighS1	100	Hz	U16	RW	[3000, 8000]	Grid over freq value in state 1
45410	GridFreqHighS1Time	1	periods	U16	RW	[1, 65535]	Grid over freq time in state 1
45411	GridFreqLowS1	100	Hz	U16	RW	[3000, 8000]	Grid under freq value state 1
45412	GridFreqLowS1Time	1	periods	U16	RW	[1, 65535]	Grid under freq time state 1

45413	GridFreqHighS2	100	Hz	U16	RW	[3000, 8000]	Grid over freq value in state 2
45414	GridFreqHighS2Time	1	periods	U16	RW	[1, 65535]	Grid over freq time in state 2
45415	GridFreqLowS2	100	Hz	U16	RW	[3000, 8000]	Grid under freq value state 2
45416	GridFreqLowS2Time	1	periods	U16	RW	[1, 65535]	Grid under freq time state 2
45417	GridVoltHigh	10	V	U16	RW	[1100, 3000]	Grid volt connect high value
45418	GridVoltLow	10	V	U16	RW	[1100, 3000]	Grid volt connect low value
45419	GridFreqHigh	100	Hz	U16	RW	[3000, 8000]	Grid freq connect high value
45420	GridFreqLow	100	Hz	U16	RW	[3000, 8000]	Grid freq connect low value
45421	GridStartTime	1	s	U16	RW	[30, 65535]	First on grid waiting time value
45422	GridVoltRecoverHigh	10	V	U16	RW	[1100, 3000]	Grid volt recover high value
45423	GridVoltRecoverLow	10	V	U16	RW	[1100, 3000]	Grid volt recover low value
45424	GridFreqRecoverHigh	100	Hz	U16	RW	[3000, 8000]	Grid freq recover high value
45425	GridFreqRecoverLow	100	Hz	U16	RW	[3000, 8000]	Grid freq recover low value
45426	GridRecoverTime	1	s	U16	RW	[30, 65535]	Grid fault recover time value
45427	Reserved	1	s	U16	RW	[1, 65535]	Reserved
45428	Power rate limit (generate)	1	s	U16	RW	[0, 65535]	Grid power slope
45429	Power rate limit (reconnect)	1	s	U16	RW	[0, 65535]	Reconnect Grid power slope
45430	Power rate limit (reduction)	1	s	U16	RW	[0, 65535]	Power reduction slope
45431	GridProtect	1	NA	U16	RW	[0, 1]	Grid protect switch. 0: off, 1: On
45432	power slope enable	1	NA	U16	RW	[0, 1]	Grid slope switch. 0: Off, 1: On
45433	EnableCurve	1	NA	U16	RW	[0, 1]	cosφ(P) curve switch, 0: Off 1: On
45434	A point powerPerc	1	%Pn	S16	RW	[-1000, 1000]	A Point power
45435	A point cos φ	100	NA	S16	RW	[-100, 100]	A point cos φ value
45436	B point powerPerc	1	%Pn	S16	RW	[-1000, 1000]	B Point power
45437	B point cos φ	100	NA	S16	RW	[-100, 100]	B point cos φ value
45438	C pointpowerPerc	1	%Pn	S16	RW	[-1000, 1000]	C Point power
45439	C point cos φ	100	NA	S16	RW	[-100, 100]	C point cos φ value
45440	lock in voltage	10	V	U16	RW	[600, 3000]	

45441	lock out voltage	10	V	U16	RW	[600, 3000]	
45442	lock out powerPerc	1	%Pn	S16	RW	[-1000, 1000]	
45443	Power & frequency curve	1	NA	U16	RW	[0, 1]	Frequency power curve switch. 0 :Off 1 :On
45444	Ffrozen-DCH (frequency of Pm)	100	Hz	U16	RW	[3000, 8000]	Over frequency starting point
45445	Ffrozen-CH (frequency of Pm)	100	Hz	U16	RW	[3000, 8000]	Under frequency starting point
45446	fstop-DCH	100	Hz	U16	RW	[3000, 8000]	Over frequency end point
45447	fstop-CH	100	Hz	U16	RW	[3000, 8000]	Under frequency end point
45448	Recovery waiting	1	s	U16	RW	[1, 65535]	Frequency recovery wait time
45449	Recovery frequency1	100	Hz	U16	RW	[3000, 8000]	Recovery frequency maximum
45450	Recovery frequency2	100	Hz	U16	RW	[3000, 8000]	Recovery frequency minimum
45451	RecoveryHoldTime	1	s	U16	RW	[1, 65535]	Frequency recovery hold time
45452	Ffrozen-DCH (frequency of Pm) FP_Setting	NA	NA	U16	RW	[1, 65535]	Frequency power curve config refer to Table 9-7
45453	Ffrozen-CH (frequency of Pm) Over frequency	1	%/Hz	S16	RW	[-1000, 1000]	Over frequency power reduction slope
45454	down slope power reference Under frequency	1	%/Hz	S16	RW	[-1000, 1000]	Under frequency power reduction slope
45455	down slope FP_RecoverPowerPe	1	% Pn/min	S16	RW	[-1000, 1000]	Frequency power curve recovery slope
45456	QU curve	1	NA	U16	RW	[0, 1]	QU Curve switch. 0 :Off 1 :On
45457	QU lock in powerPerc	1	%Pn	S16	RW	[-1000, 1000]	Enter QU curve power
45458	QU lock out	1	%Pn	S16	RW	[-1000, 1000]	Exit QU curve power
45459	QU V1 voltage	10	V	U16	RW	[600, 3000]	QU V1 voltage value
45460	QU V1 value (var % rated VA)	1	%Pn	S16	RW	[-1000, 1000]	QU V1 reactive value

45461	QU V2 voltage	10	V	U16	RW	[600, 3000]	QU V2 voltage value
45462	QU V2 value (var ‰ rated VA)	1	‰Pn	S16	RW	[-1000, 1000]	QU V2 reactive value
45463	QU V3 voltage	10	V	U16	RW	[600, 3000]	QU V3 voltage value
45464	QU V3 value (var ‰ rated VA)	1	‰Pn	S16	RW	[-1000, 1000]	QU V3 reactive value
45465	QU V4 voltage	10	V	U16	RW	[600, 3000]	QU V4 voltage value
45466	QU V4 value (var ‰ rated VA)	1	‰Pn	S16	RW	[-1000, 1000]	QU V4 reactive value
45467	QU K value (Select one set: K value or V2 value & V3 value)	1	Var	S16	RW	[0, 65535]	(Reserved)
45468	QU time constant	1	NA	U16	RW	[0, 4096]	QU filter time constant
45469	Reserved						Miscellanea (Reserved)
45470	Reserved						Rated Voltage(korea)(Reserved)
45471	Reserved						response time(korea)(Reserved)
45472	PU curve	1	NA	U16	RW	[0, 1]	PU Curve switch 0 :Off 1 :On
45473	Power change rate	1	s	U16	RW	[0, 65535]	Power rate of change
45474	PU V1 voltage	10	V	U16	RW	[600, 3000]	PU V1 voltage value
45475	PU V1 value ((P/Pn))	1	‰Pn	S16	RW	[-1000, 1000]	PU V1 active value
45476	PU V2 voltage	10	V	U16	RW	[600, 3000]	PU V2 voltage value
45477	PU V2 value ((P/Pn))	1	‰Pn	S16	RW	[-1000, 1000]	PU V2 active value
45478	PU V3 voltage	10	V	U16	RW	[600, 3000]	PU V3 voltage value
45479	PU V3 value ((P/Pn))	1	‰Pn	S16	RW	[-1000, 1000]	PU V3 active value
45480	PU V4 voltage	10	V	U16	RW	[600, 3000]	PU V4 voltage value
45481	PU V4 value ((P/Pn))	1	‰Pn	S16	RW	[-1000, 1000]	PU V4 active value
45482	Fixed Power Factor	100	NA	U16	RW	[0,20]&[80,100]1-20 as 0.99-0.8 lagging, 80-100 as leading 0.80-1	Fixed PF
45483	Fixed reactive power	1	‰Pn	S16	RW	[-1000, 1000]	Fixed reactive
45484	Fixed active power	1	‰Pn	U16	RW	[0, 1000]	Fixed active
45485	Reserved	NA			RW		(Reserved)

45486	Reserved	NA			RW		(Reserved)
45487	Reserved	NA			RW		(Reserved)
45488	Auto Test Enable	1	NA	U16	RW	[0, 1]	0 :(Stop), 1 :(Start)
45489	Auto Test step	1	NA	U16	RW	0~8	1:Step59S1, 2:Step59S2
							3:Step27S1, 4:Step81>.S1
							5:Step81<.S1, 6:Step81>.S2
							7:Step81<.S2, 8:Step27S2
45490	uwlItalyFreqMode	1	NA	U16	RW	0: Disable	Set the under frequency threshold range for CEI safety regulations
						1: 81>.S2 1S&4S	
						2: 81 >.S2 0.1S	
						3: 81 >.S1	
45491	All Power Curve Disable	1	NA	U16	R	[0,1]	1 :Close all safety curves, 0 :Nomal
45492	R phase fixed active power	1	‰	U16	RW	[0,1000]	(Reserved)
45493	S phase fixed active power	1	‰	U16	RW	[0,1000]	(Reserved)
45494	T phase fixed active power	1	‰	U16	RW	[0,1000]	(Reserved)
45495	GridVoltHighS3	10	V	U16	RW	[600, 3000]	Grid over volt value in state 3
45496	GridVoltHighS3Time	1	periods	U16	RW	[1, 65535]	Grid over volt time in state 3
45497	GridVoltLowS3	10	V	U16	RW	[100, 3000]	Grid under volt value in state 3
45498	GridVoltLowS3Time	1	periods	U16	RW	[1, 65535]	Grid under volt time in state 3
45499	ZvrtConfig	1	NA	U16	RW	[0,3]	Voltage cross curve switch
							0: off, 1: Open only LVRT
							2: Open only HVRT, 3: All open

45500	LvrtStartVolt	10	V	U16	RW	[0,2300]	Low voltage cross starting point voltage
45501	LvrtEndVolt	10	V	U16	RW	[0,2300]	Low voltage cross terminal volt.
45502	LvrtStartTripTime	1	periods	U16	RW	[1,65535]	Low pressure cross starting point trip time
45503	LvrtEndTripTime	1	periods	U16	RW	[1,65535]	Low pressure cross end point trip time
45504	LvrtTripLimitVolt	10	V	U16	RW	[0,2300]	Low voltage cross trip threshold
45505	HvrtStartVolt	10	V	U16	RW	[2300,3000]	High voltage cross starting point voltage
45506	HvrtEndVolt	10	V	U16	RW	[2300,3000]	High voltage cross terminal volt.
45507	HvrtStartTripTime	1	periods	U16	RW	[1,65535]	High pressure cross starting point
45508	HvrtEndTripTime	1	periods	U16	RW	[1,65535]	High pressure cross the end point
45509	HvrtTripLimitVolt	10	V	U16	RW	[2300,3000]	High voltage cross trip threshold
45510	PF time constant	1	NA	U16	RW	[0, 4096]	PF filter time constant
45511	Power Freq time constant	1	NA	U16	RW	[0, 4096]	Power Freq filter time constant
45512	PU time constant	1	NA	U16	RW	[0, 4096]	PU filter time constant
Function setting data address							
47010	Dred OffGrid Check	1	NA	U16	RW	[0, 1]	1:on 0:off
47015	MeterCT1reverseEnable	1	NA	U16	RW	[0, 1]	1:on 0:off
47016	ErrLogCurrentPage	1	NA	U16	RW	[0,63]	
47017	CtOnLoadFlag	1	NA	U16	RW	[0,1]	1:CTonLoad
							0:CTonGrid
47018	On-	1	W	S16	RW		On-grid inverter active power in AC coupled system
47019	On-gridInvReactivePower	1	W	S16	RW		On-grid inverter reactive power in AC coupled system

47400	ActiveEtotalSell_R	100	1KW.Hr		RW	Total active energy(Sell) = (Total active energy(Sell)/HH* 134215680)+(Total active energy(Sell)/H*66536)+ (Total active energy(Sell)/L)	If using GM1000 single phase smart meter,only have phase R
47403	ActiveEtotalSell_S	100	1KW.Hr		RW		
47406	ActiveEtotalSell_T	100	1KW.Hr		RW		
47409	ActiveEtotalSell_Total	100	1KW.Hr		RW		
47412	ActiveEtotalBuy_R	100	1KW.Hr		RW		
47415	ActiveEtotalBuy_S	100	1KW.Hr		RW		
47418	ActiveEtotalBuy_T	100	1KW.Hr		RW		
47421	ActiveEtotalBuy_Total	100	1KW.Hr		RW		
47424	ActiveEtotalSell_R	100	1KW.Hr		RW		
47428	ActiveEtotalSell_S	100	1KW.Hr		RW		
47432	ActiveEtotalSell_T	100	1KW.Hr		RW		
47436	ActiveEtotalSell_Total	100	1KW.Hr		RW		
47440	ActiveEtotalBuy_R	100	1KW.Hr		RW		
47444	ActiveEtotalBuy_S	100	1KW.Hr		RW		
47448	ActiveEtotalBuy_T	100	1KW.Hr		RW		
47452	ActiveEtotalBuy_Total	100	1KW.Hr		RW		

Table 8-1

Mode	Code	Description
Wait	0x00 0x00	Loss, inverter disconnects to Grid
Normal	0x00 0x01	OK, inverter connects to Grid
OffGrid	0x00 0x02	PV inputs to Inverter(First),Battery inputs to Inverter (Second), Inverter work as AC source
Permanent Fault	0x00 0x03	System is seriously abnormal. Inverter will restart after 20s.The conditions to enter this status are as follows:
		1.Grid current DC offset
		2.Eeprom cannot be read or write in
		3.Communication between CPU failure
		4.Bus Voltage too high
		5.Compare measured values from two CPU
		6.relay check fail
		7.GFCI Device check fail
		8.HCT check fail
Flash	0x04	Inverter upgrade
Check	0x05	Power on self-check of inverter

Table 8-2

Bit NO	Error message	Description
Bit31	Internal Communication	Communication between microcontrollers is failure
Bit30	EEPROM R/W Failure	EEPROM cannot be read or written
Bit29	Fac Failure	The grid frequency is out of tolerable range
Bit28	TBD	NA
Bit27	TBD	NA
Bit26	TBD	NA
Bit25	Relay Check Failure	Relay check is failure
Bit24	TBD	NA
Bit23	Vac Consistency Failure	Different value between Master and Slave for grid voltage
Bit22	Fac Consistency Failure	Different value between Master and Slave for grid frequency
Bit21	TBD	NA
Bit20	TBD	NA
Bit19	DC Injection High	The DC injection to grid is too high
Bit18	Isolation Failure	Isolation resistance of PV-plant out of tolerable range
Bit17	Vac Failure	Grid voltage out of tolerable range
Bit16	External Fan Failure	The external fan failure
Bit15	PV Over Voltage	Pv input voltage is over the tolerable maximum value
Bit14	Auto Test Failure	Auto test failure
Bit13	Over Temperature	Temperature is too high
Bit12	Internal Fan Failure(Back-Up Over Load for ES)	The fan in case failure

Bit11	DC Bus High	Dc bus is too high
Bit10	Ground I Failure	Ground current is too high
Bit9	Utility Loss	Utility is unavailable
Bit8	AC HCT Failure	AC HCT check failure 3 times
Bit7	Relay Device Failure	Relay check failure 3 times
Bit6	GFCI Device Failure	GFCI check failure 3 times
Bit5	TBD	NA
Bit4	GFCI Consistency Failure	Different value between Master and Slave for GFCI
Bit3	DCI Consistency Failure	Different output DC current value between Master & Slave
Bit2	TBD	NA
Bit1	AC HCT Check Failure	The output current sensor is abnormal
Bit0	GFCI Device Check Failure	The GFCI detecting circuit is abnormal

Table 8-4

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

Table 8-5

BMS Status Code	Description
Bit0	BMS Standby
Bit1	BMS Working
Bit2	BMS Parallel
Bit3	BMS Maintain
Bit4	BMS ChargeEn
Bit5	BMS Must Charge
Bit6	BMS DisChargeEn
Bit7	BMS Charging
Bit8	BMS DisCharging
Bit9	BMS SOC Adjust
Bit...	Reserved

Table 8-6

Inverter Warning Code	Description
Warning Code <= 64	
Bit0	LLC hardware overcurrent
Bit1	LLC BOOST hardware overcurrent
Bit2	LLC BOOST software overcurrent or BMS overcurrent fault
Bit3	Battery current RMS overcurrent
Bit4	Off-grid battery current exceeds BMS current limit

Warning Code > 64	
101	PV BOOST hardware overcurrent
105	Load overload
106	Grid voltage sampling is too high
107	Inverter hardware or software sampling over 8 times
108	PV BOOST software overcurrent
109	BUS voltage is too high
120	Off-grid output voltage is too high
121	Off-grid output voltage is too low
122	BUS voltage is too low
123	PV voltage is too low
125	Off-grid mode battery voltage low shutdown protection
126	Triggering inverter hardware single overcurrent
128	Self-test BUS soft start failed
129	No PV grid-connected mode battery disconnect shutdown protection
130	Grid backflow

Table 8-8

Bit NO	Error message	Description
Bit0	Battery Over Temperature	Charging: Stop charge , Discharging: reduce discharge current
Bit1	Battery Under Temperature	
Bit2	Battery Cell Voltage Differences	NA
Bit3	Battery Over Total Voltage	Stop charge
Bit4	Battery Discharge Over Current	Stop discharge
Bit5	Battery Charge Over Current	reduce charge current

Bit6	Battery Under SOC	Stop discharge
Bit7	Battery Under Total Voltage	Stop discharge
Bit8	Battery Communication Fail	Stop BMS Function, Inverter manage battery
Bit9	Battery Output Short	Inverter shutdown
Bit10	BMSSOCTooHigh	
Bit11	BMSModuleFault	
Bit12	BMSSystemFault	
Bit13	BMSInternalFault	
Bit...		
Bit16	Battery Charge High Temp.	
Bit17	Battery Discharge High	
Bit18	Battery Charge Low Temp.	
Bit19	Battery Discharge Low	
Bit...		
Bit31		

Table 8-9

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

Table 8-10

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

Table 8-11

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

Table 8-12

Mode Code	Description
0x00	Inverter self-check(check mode)
0x01	cut off all the connection to Inverter(wait mode)
0x02	PV inputs to Inverter,Inverter outputs to Grid(online mode)
0x04	PV inputs to Inverter(First),Battery inputs to Inverter(Second),Inverter work as AC
	source(battery mode)
0x10	Fault,something is in fault mode(fault mode)

Table 8-13

Code	Description
0x00	Inverter neither send power to Grid, nor get power from Grid.
0x01	Inverter sends power to Grid
0x02	Inverter gets power from Grid.

Table 8-14

Bit	Description	Explanation	Types
0	BatteryVoltLow	Battery doesn't discharge because of low voltage	Discharge disturbed
1	BatterySOCLow	Battery doesn't discharge because of low SOC	
2	BatterySOCInBack	Battery SOC doesn't recover to dischargeable level	
3	BMSDischargeDisable	BMS doesn't allow discharge	
4	DischargeTimeOn	Discharge time is set. 1: On, 0: Off	
5	ChargeTimeOn	Charge time is set. 1: On, 0: Off	
6	DischargeDriveOn	Discharge drive is ON	
7	BMSDischgCurrentLow	BMS-Allowed discharge current is low	
8	DischargeCurrentLow	Allowed discharge current is low (from	
9	MeterCommLoss	Smart Meter communication fails	
10	MeterConnectReverse	Smart Meter/CT is reversed	
11	SelfUseLoadLight	Load power is low, cannot active discharge ability	
12	EMSDischargeIZero	EMS-control discharge current limit is 0A	
13	DischargeBUSHigh	Cannot discharge caused by high PV	

14	BatteryDisconnect	Battery disconnected or turned off	Charge disturbed
15	BatteryOvercharge	Battery is overcharged	
16	BMSOverTemperature	Lithium Battery temperature is too high	
17	BMSOvercharge	Lithium Battery overcharged (pack or cell)	
18	BMSChargeDisable	Lithium Battery does not allow charging	Discharge disturbed
19	SelfUseOff	Self-use mode is turned off	
20	SOCDeltaOverRange	Battery SOC jumps abnormally	Other Problems
21	BatterySelfDischarge	Battery self-discharge > 30% SOC continuously	
22	OffgridSOCLow	Warning on low SOC under off-grid	
23	GridWaveUnstable	System switch to off-grid mode frequently because of bad grid wave	
24	FeedPowerLimit	Export power limit is set	
25	PFValueSet	PF value is set	
26	RealPowerLimit	Active power value is set	
27	DCOutputOn		
28	SOCProtectOff		
29	Discharge mode for BP	Only discharge at night (for BP only)	
30	BMS Charge Immediately	Battery charge compulsively (from BMS or APP)	

Table 8-15

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

Table 8-22

Bit NO	BMS System Status	Description
Bit0	BMS Standby	
Bit1	BMS Working	
Bit2	BMS Parallel	
Bit3	BMS Maintain	
Bit4	BMS Charge Enable	
Bit5	BMS Charge Immediately	
Bit6	BMS DisCharge Enable	
Bit7	BMS Charging	
Bit8	BMS DisCharging	
Bit9		
Bit...		
Bit16		

Table 8-30

Bit NO	Grid detailed fault display	Description
Bit0	GridZeroLossErr	电网停电/Power outage
Bit1	GridVoltLowErrSt1	电网欠压一级故障/Grid undervoltage first level failure
Bit2	GridVoltLowErrSt2	电网欠压二级故障/Grid undervoltage second level fault
Bit3	GridVoltLowErrSt3	电网欠压三级故障/Grid undervoltage third level fault
Bit4	GridVoltHighErrSt1	电网过压一级故障/Grid overvoltage first level failure

Bit5	GridVoltHighErrSt2	电网过压二级故障/Grid overvoltage second level fault
Bit6	GridVoltHighErrSt3	电网过压三级故障/Grid overvoltage third level fault
Bit7	Grid10minAvgVoltErr	电网平均电压高故障/Grid average voltage high fault
Bit8	GridFreqLowErrSt1	电网欠频一级故障/Grid underfrequency first level failure
Bit9	GridFreqLowErrSt2	电网欠频二级故障/Grid underfrequency second level fault
Bit10	GridIslandFreqLowErr	孤岛保护欠频故障/Islanding protection underfrequency fault
Bit11	GridFreqHighErrSt1	电网过频一级故障/Grid overfrequency first level failure
Bit12	GridFreqHighErrSt2	电网过频二级故障/Grid overfrequency second level fault
Bit13	GridIslandFreqHighErr	孤岛保护过频故障/Islanding protection overfrequency fault
Bit14	GridFreqShiftChkErr	电网频移故障/Grid frequency shift fault
Bit15	GridWaveCheckErr	电网波形检测故障/Grid waveform check fault
Bit16	GridLLVoltErrFlag	电网线电压故障标志/Grid line voltage fault flag
Bit17	GridLvrtErr	电网低电压穿越故障/Grid low voltage ride-through fault
Bit18	GridHvrtErr	电网高电压穿越故障/Grid high voltage ride-through fault
Bit19	GridVoltSampOverErr	电网电压超出采样上限/ Grid voltage exceeds the upper sampling limit
Bit20		
Bit...		
Bit63		

Table 8-31

Bit NO	Inverter detailed error	Description
Bit0	BattLLCHardOCErr	LLC硬件过流/LLC hardware overcurrent
Bit1	BattBoostHardOCErr	电池boost硬件过流/Battery boost hardware overcurrent
Bit2	BattBoostSoftOCErr	电池boost软件过流/ Battery boost software overcurrent
Bit3	BattBMSFaultErr	电池BMS故障/Battery BMS fault
Bit4	BattBMSDischgDisErr	电池BMS禁止放电/Battery BMS discharge disable
Bit5	BattCurrRmsOCErr	电池电流有效值过流/Battery current rms overcurrent
Bit6	OffgridBmsCurrLimitErr	离网模式超出BMS限流/Off-grid mode exceeds BMS current limit
Bit7	BusSoftStartFailedErr	Bus电压软启动失败/Bus voltage soft start failed
Bit8	BusVoltTooLowErr	Bus电压过低/Bus voltage is too low
Bit9	BusSampVoltTooHighErr	Bus采样电压过高/ Bus voltage is too High
Bit10	InvHardOCErr	逆变硬件过流/Inverter hardware overcurrent
Bit11	InvCurrSoftOCErr	逆变软件过流/Inverter software overcurrent
Bit12	PvBoostHardOCErr	PV boost硬件过流/PV boost hardware overcurrent
Bit13	PvBoostSoftOCErr	PV boost软件过流/PV boost software overcurrent
Bit14	GridBackflowErr	电网倒灌/Grid backflow
Bit15	OffgridBattVoltLowErr	离网电池电压低/Off-grid mode battery voltage is low
Bit16	OffgridUpsVoltHighErr	离网AC电压过高/Off-grid mode AC voltage is too low
Bit17	OffgridUpsVoltLowErr	离网AC电压过低/ Off-grid mode AC voltage is too high
Bit18	UpsOverLoadErr	Backup overload
Bit19		
Bit...		
Bit63		

Table 8-32

Bit NO	Inverter detailed Status	Description
Bit0	SafetyOverFreqCurveFlag	进入过频曲线/Over-frequency curve running
Bit1	SafetyUnderFreqCurveFlag	进入欠频曲线/Under frequency curve running
Bit2	SafetyFreqRecoCurveFlag	频率曲线退出恢复中/Frequency curve exiting recovery
Bit3	SafetyPUCurveOVFlag	进入PU过压曲线/PU overvoltage curve running
Bit4	SafetyPUCurveUVFlag	进入PU欠压曲线/PU undervoltage curve running
Bit5	SafetyQUCurveFlag	进入QU曲线/QU curve running
Bit6	SafetyPFCurveFlag	进入PF曲线/PF curve running
Bit7	FixedPFSettingFlag	固定PF已设定/Fixed PF is set
Bit8	FixedQSettingFlag	固定无功已设定/Fixed reactive power is set
Bit9	InvOverTempFlag	机器过温降载/Inverter over-temp. derating curve operation
Bit10	DREDSellPowerLimitFlag	澳洲DRED卖电/Australian DRED electricity sale status
Bit11	DREDBuyPowerLimitFlag	澳洲DRED买电/Australian DRED purchase status
Bit12	ActivePowerSettingFlag	有功功率限制已设定/Active power limit is set
Bit13	GeDratePowerFlag	德国70%降额打开70% derating (Germany) has been opened
Bit14	AutoTestEnableFlag	CEI021 selftest running
Bit15	GridVoltSt1DrateFlag	一级电压保护前降载/Inverter first level overvoltage derate
Bit...		

Table 9-1

Bit No	Definition	Status	
		1	0
Bit15	TBD	-	
Bit14			
Bit13	TBD		
Bit12	Battery active	ON	OFF
Bit11	Feeding enable	ON	OFF
Bit10	EMS Mode	ON	OFF
Bit9	Auto Mode	ON	OFF
Bit8	Meter	OK	NG
Bit7	MPPT for Shadow	ON	OFF
Bit6	TBD	ON	OFF
Bit5	TBD	ON	OFF
Bit4	TBD	ON	OFF
Bit3	Power Limit Function	ON	OFF
Bit2	TBD	ON	OFF
Bit1	TBD	ON	OFF
Bit0	TBD	ON	OFF

Table 9-2

MODE	COMMAND	EFFECT
Auto	ModeValue: 0x01	Note: PBattery = PInv - Pmeter – Ppv (Discharge/Charge)
	PowerLimitValue: 0 (2byte)	
Stopped	ModeValue: 0xFF	Note :Stop working and switch to wait mode
	PowerLimitValue: 0 (2byte)	
Charge	ModeValue: 0x02	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.
	PowerLimitValue: x w(2byte)	
PVCharge	ModeValue: 0x0A PowerLimitValue: x w(2byte)	Charge mode: 1. x means the max charge power. If Charge Power Limit set as 0W, means only PV is allowed to charge battery. 2. Charge Power fluctuates according to charge current.
Discharge	ModeValue: 0x03	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.
	PowerLimitValue: x w(2byte)	
Import	ModeValue: 0x04 PowerLimitValue: x w(2byte)	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	ModeValue: 0x05 PowerLimitValue: x w(2byte)	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)

Conservative	ModeValue: 0x06	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.
	PowerLimitValue: x w(2byte)	
Offgrid	ModeValue: 0x07	Note : PBattery =Pbackup – Ppv (Charge/Discharge) Forced off-grid operation (Disconnect from grid)
	PowerLimitValue: x (2byte)	

Table 9-3

Data	Description
1	0.99 lagging
2	0.98 lagging
3	0.97 lagging
4	0.96 lagging
5	0.95 lagging
6	0.94 lagging
7	0.93 lagging
8	0.92 lagging
9	0.91 lagging
10	0.90 lagging

11	0.89 lagging
12	0.88 lagging
13	0.87 lagging
14	0.86 lagging
15	0.85 lagging
16	0.84 lagging
17	0.83 lagging
18	0.82 lagging
19	0.81 lagging
20	0.80 lagging
80	0.80 leading
81	0.81 leading
82	0.82 leading
83	0.83 leading
84	0.84 leading

85	0.85 leading
86	0.86 leading
87	0.87 leading
88	0.88 leading
89	0.89 leading
90	0.90 leading
91	0.91 leading
92	0.92 leading
93	0.93 leading
94	0.94 leading
95	0.95 leading
96	0.96 leading
97	0.97 leading
98	0.98 leading
99	0.99 leading
100	1

Table 9-4

Code	Description	Grid connection standards
0x00	Italy	ENEL (Un: 230Vac)
0x01	Czech	EN50549(CZ) (Un: 230Vac)
0x02	Germany	VDE-AR-N 4105(Un: 230Vac)
0x03	Spain	RD1699(Un: 230Vac)
0x04	GreeceMainland	EN50549(GR) (Un: 230Vac)
0x05	Danmark	EN50549(DK)
0x06	Belgium	C10/C11(Un: 230Vac)
0x07	Romania	(Un: 230Vac)
0x08	G98	G98 (Un: 230Vac)
0x09	Australia-A	Australia
0x0A	France	VDE0126
0x0B	China	NB-T
0x0C	60Hz Grid Default	CSA
0x0D	Poland	EN50549
0x0E	South Africa	(Un: 230Vac)
0x10	Brazil	(Un: 220Vac)
0x11	Thailand MEA	MEA
0x12	Thailand PEA	PEA
0x13	Mauritius	(Un: 230Vac)
0x14	Holland	EN50549
0x15	G99	Northern Ireland
0x16	China Higher	NB-T
0x17	French 50Hz	(Un: 230Vac)
0x18	French 60Hz	(Un: 230Vac)
0x19	Australia Ergon	AS/NZS 4777.2

0x1A	Australia Energex	AS/NZS 4777.2
0x1B	Holland 16/20A	EN50549
0x1C	Korea	(Un: 220Vac)
0x1D	China Station	NB-T
0x1E	Austria	(Un: 230Vac)
0x1F	India	IEC61727
0x20	50Hz Grid Default	Default
0x21	Warehouse	Warehouse
0x22	Philippines	Philippines
0x23	Ireland	EN50549 Ireland
0x24	Taiwan	(Un: 230Vac)
0x25	Bulgaria	EN50549
0x26	Barbados	(Un: 230Vac)
0x27	China Highest	NB-T
0x29	Sweden	EN50549 (Un: 230Vac)
0x2A	Chile	BISI 4.0 (Un: 220Vac)
0x2C	NewZealand	AS/NZS 4777.2
0x2D	IEEE1547 208Vac	IEEE1547 (Un: 120/208Vac)
0x2E	IEEE1547 220Vac	IEEE1547 (Un: 127/220Vac)
0x2F	IEEE1547 240Vac	IEEE1547 (Un: 138.6/240Vac)
0x30	60Hz LV Default	60Hz LV Default

0x31	50Hz LV Default	50Hz LV Default
0x32	Australia WAPN	WAPN
0x33	Australia MicroGrid	MicroGrid
0x34	JP_50Hz	JP_50Hz
0x35	JP_60Hz	JP_60Hz
0x36	India Higher	IEC61727 (Un: 230Vac)
0x37	DEWA LV	DEWA (Un:230Vac)
0x38	DEWA MV	DEWA (Un:230Vac)
0x39	Slovakia	EN50549(SV) (Un: 230Vac)
0x3A	GreenGrid	AS/NZS 4777.2
0x3B	Hungary	(Un: 230Vac)
0x3C	SriLanka	(Un: 230Vac)
0x3D	SpainIslands	RD1699 (Un: 230Vac)
0x3E	Ergon30K	(Un: 230Vac)
0x3F	Energe30K	(Un: 230Vac)
0x40	IEEE1547_230VAC	IEEE1547 (Un: 230/400Vac)
0x41	IEC61727_60Hz	IEC61727 (Un: 230Vac)
0x42	Switzerland	VDE-AR-N 4105 (Un: 230Vac)
0x43	CEI_016	CEI-016 (Un: 230Vac)
0x44	Australia Horizon	AS/NZS 4777.2
0x45	Cyprus	(Un: 230Vac)
0x46	Australia SAPN	AS/NZS 4777.2
0x47	Australia Ausgrid	AS/NZS 4777.2

0x48	Australia Essential	AS/NZS 4777.2
0x49	Australia Victoria	AS/NZS 4777.2
0x4A	HongKong	
0x4E	VDE4110	VDE4110
0x51	Australia Endeavour	Endeavour
0x52	Argentina	
0x55	Australia-B	Australia
0x56	Australia-C	Australia

Table 9-5 **Inverter ARM firmware version<=6**

Code	Type	Description
0x01	Li-ion	BYD B-BOX2.5
0x02	Li-ion	BYD B-BOX5.0
0x03	Li-ion	BYD B-BOX7.5
0x04	Li-ion	BYD B-BOX10
0x05	Li-ion	BYD B-BOX12.5
0x06	Li-ion	LG RESU6.4EX
0x07	Li-ion	LG RESU10
0x08	Li-ion	LG RESU6.5
0x09	Li-ion	LG RESU3.3
0x0A	Li-ion	PYLON US2000A
0x0B	Li-ion	PYLON US2000B*1
0x0C	Li-ion	PYLON US2000B*2

0x0D	Li-ion	PYLON US2000B*3
0x0E	Li-ion	PYLON US2000B*4
0x0F	VRLAB	Hoppecke Sun.powerpack 11kWH
0x10	VRLAB	Hoppecke Sun.powerpack 11kWH
0x11	Li-ion	GCL 5.6kWH
0x12	Li-ion	Factory battery*1
0x13	Li-ion	Factory battery*2
0x14	VRLAB	Default
0x15	VRLAB	Self-define
0x16	Li-ion	BYD BOX L 7.0+
0x17		Reserved
0x18		Reserved
0x19		Reserved
0x1A		Reserved
0x1B		Reserved
0x1C		Reserved
0x1D		Reserved
0x1E		Reserved
0x1F	Li-ion	GCL 5.6kWH*2
0x20	Li-ion	GCL 5.6kWH*3
0x21	Li-ion	GCL 5.6kWH*4
0x22	Li-ion	ALPHA SMILE5-BAT*1
0x23	Li-ion	ALPHA SMILE5-BAT *2
0x24	Li-ion	ALPHA SMILE5-BAT *3
0x25	Li-ion	ALPHA SMILE5-BAT *4+
0x26	Li-ion	PYLON US2000Plus*1
0x27	Li-ion	PYLON US2000Plus*2

0x28	Li-ion	PYLON US2000Plus*3
0x29	Li-ion	PYLON US2000Plus*4

Inverter ARM Firmware version>6

Code	Type	Description
242	Li-ion	GOODWE SECU-A5.4L*1
243	Li-ion	GOODWE SECU-A5.4L*2
244	Li-ion	GOODWE SECU-A5.4L*3
245	Li-ion	GOODWE SECU-A5.4L*4
246	Li-ion	GOODWE SECU-A5.4L*5
247	Li-ion	GOODWE SECU-A5.4L*6
232	Li-ion	GOODWE LX U5.4-L*1
233	Li-ion	GOODWE LX U5.4-L*2
234	Li-ion	GOODWE LX U5.4-L*3
235	Li-ion	GOODWE LX U5.4-L*4
236	Li-ion	GOODWE LX U5.4-L*5
237	Li-ion	GOODWE LX U5.4-L*6
0	Li-ion	Self-define
50	Li-ion	BYD Battery-Box Pro 2.5
51	Li-ion	BYD Battery-Box Pro 5.0
52	Li-ion	BYD Battery-Box Pro 7.5
53	Li-ion	BYD Battery-Box Pro 10.0
54	Li-ion	BYD Battery-Box Pro 12.8
55	Li-ion	BYD Battery-Box Pro 13.8
56	Li-ion	BYD Battery-Box Pro 15.1
57	Li-ion	BYD Battery-Box L 3.5
64	Li-ion	BYD Battery-Box L 7.0

65	Li-ion	BYD Battery-Box L 10.5
66	Li-ion	BYD Battery-Box L 14
67	Li-ion	BYD Battery-Box Res 2.5
68	Li-ion	BYD Battery-Box Res 5.0
69	Li-ion	BYD Battery-Box Res 7.5
70	Li-ion	BYD Battery-Box Res 10.0
71	Li-ion	BYD Battery-Box Pro 3.8
72	Li-ion	BYD Battery-Box Pro 7.6
73	Li-ion	BYD Battery-Box Pro 11.5
74	Li-ion	BYD Battery-Box Pro 15.3
75	Li-ion	BYD Battery-Box Premium LVS 4.0
76	Li-ion	BYD Battery-Box Premium LVS 8.0
77	Li-ion	BYD Battery-Box Premium LVS 12.0
78	Li-ion	BYD Battery-Box Premium LVS 16.0
79	Li-ion	BYD Battery-Box Premium LVS 20.0
80	Li-ion	BYD Battery-Box Premium LVS 24.0
81	Li-ion	BYD Battery-Box Premium LVL 15.4
96	Li-ion	LG RESU6.4EX
97	Li-ion	LG RESU10
98	Li-ion	LG RESU6.5
99	Li-ion	LG RESU3.3
100	Li-ion	LG RESU13
113	Li-ion	PYLON US2000B*1
114	Li-ion	PYLON US2000B*2
115	Li-ion	PYLON US2000B*3
116	Li-ion	PYLON US2000B*4+
117	Li-ion	PYLON US2000Plus*1

118	Li-ion	PYLON US2000Plus*2
119	Li-ion	PYLON US2000Plus*3
120	Li-ion	PYLON US2000Plus*4+
121	Li-ion	PYLON US3000*1
128	Li-ion	PYLON US3000*2
129	Li-ion	PYLON US3000*3
130	Li-ion	PYLON US3000*4+
122	Li-ion	PYLON US2000B-TB*1
123	Li-ion	PYLON US2000B-TB*2
124	Li-ion	PYLON US2000B-TB*3
125	Li-ion	PYLON US2000B-TB*4+
101	Li-ion	PYLON US2000C*1
102	Li-ion	PYLON US2000C*2
103	Li-ion	PYLON US2000C*3
104	Li-ion	PYLON US2000C*4+
105	Li-ion	PYLON US3000C*1
106	Li-ion	PYLON US3000C*2
107	Li-ion	PYLON US3000C*3
108	Li-ion	PYLON US3000C*4+
126	Li-ion	OLOID LBS051100A-A02
127	Li-ion	OLOID LBS051200A-A02
133	Li-ion	OLOID LBA051100A-B
134	Li-ion	OLOID LBA051200A-B
135	Li-ion	OLOID LBA051300A-B
131	Li-ion	UZ L051100-A1
131	Li-ion	UZ L051100-A2+
139	Li-ion	Smile-BAT-13.3P

140	Li-ion	M48112-P
141	Li-ion	M48112-P*n
142	Li-ion	M48100-P
143	Li-ion	Smile5-BAT*1
144	Li-ion	Smile5-BAT*n
145	Li-ion	M48100-P*n
146	Li-ion	M4856-P-BAT*1
147	Li-ion	M4856-P-BAT*n
148	Li-ion	Smile-BAT-10.1P
149	Li-ion	Smile-BAT-10.3P
192	Li-ion	GCL 5.6kWH
193	Li-ion	GCL 5.6kWH*2
194	Li-ion	GCL 5.6kWH*3
195	Li-ion	GCL 5.6kWH*4
208	Li-ion	DYNESS B4850*1
209	Li-ion	DYNESS B4850*2
210	Li-ion	DYNESS B4850*3
211	Li-ion	DYNESS B4850*4
212	Li-ion	DYNESS PowerBox F-2.5
213	Li-ion	DYNESS PowerBox F-5.0
214	Li-ion	DYNESS PowerBox F-7.5
215	Li-ion	DYNESS PowerBox F-10.0
250		No battery
251		EMS Battery

Table 9-6

Code	Type	Description
0x00		ATSDDevice
0x03	Li-ion	PYLONBMS_I
0x04	Li-ion	PYLONBMS_II
0x05	Li-ion	Reserved
0x06	Li-ion	LishenBMS
0x07	Li-ion	BYDBMS
0x08	Li-ion	LGBMS
0x09	Li-ion	BYDBMU
0x0A	Li-ion	Reserved
0x0B	Li-ion	GCLBMS
0x0C	Li-ion	PYLONBMS_Plus
0x0D	Li-ion	LishenJP
0x0E~0x1D		Reserved
0x1E	Li-ion	GoodWeProtocol
0x1F		ProtoWareHouse
0x20		LeadAcidBattery

Bit NO	FP Setting Bit	Description
Bit0	FP_OFSSlopePowerHold	Overfrequency power retention enabled
Bit1	FP_UFSlopePowerHold	Underfrequency power retention enabled
Bit2	FP_OFFixSlopePn	Overfrequency power slope is calculated according to Pn
Bit3	FP_UFFixSlopePn	Underfrequency power slope is calculated according to Pn
Bit4	FP_RecoverFixPower	Over-under-frequency recovery power slope is calculated according to Pn
Bit5	FP_StopModeOFChargeEn	Allow charging when over frequency
Bit6	FP_StopModeUFDISchargeEn	Allow discharge when underfrequency
Bit7	FP_OFRecoverPrate	Overfrequency recovery is calculated by Pn
Bit8	FP_UFRecoverPrate	Underfrequency recovery is calculated by Pn
Bit9	FP_OFFixSlopePm	Overfrequency power slope is calculated according to Pm
Bit10	FP_UFFixSlopePm	Underfrequency power slope is calculated according to Pm
Bit11		
Bit12		
Bit...		
Bit15		

7.1 Read lowest PV voltage for feeding power (Single register at once)

AP sends:

01H	03H	00H	00H	00H,01H	84H	0AH
Inverter Addr.	Read Function	First Addr. of register		Amount of registers	CRC Verification Code	

Inverter Response:

01H	03H	02H	0AH	FOH	BEH	A0H
Inverter Addr.	Read Function	Bytes Amount	Data High byte	Data Low Byte	CRC Verification Code	

Data is 2800, and the unit for the data is 0.1v. So actual value is 280.0v

7.2 Read lowest PV voltage for feeding power and reconnect time (multiply registers at once)

AP sends:

01H	03H	00H	00H	00H,02H	C4H	0BH
Inverter Addr.	Read Function	First Addr. Of register		Amount of registers	CRC Verification Code	

Inverter Response:

01H	03H	04H	0AH	FOH	00H	1EH	79H	D0H
Inverter Addr.	Read Function	Amount of Bytes	High byte of Data1	Low Byte of Data1	High byte of Data2	Low Byte of Data2	CRC Verification Code	

Data1 is 2800, and the unit for the data is 0.1v, so actual value is 280.0v

Data 2 is 30, and the unit for the data is 1s, so actual value is 30s.

7.3 Read Serial Number

AP sends:

01H	03H	02H	00H	00H,08H	45H	B4H
Inverter Addr.	Read Function	First Addr. of register		Amount of registers	CRC Verification Code	

Inverter response:

01H	03H	10H	41H,41H,41H,41H,41H,41H,41H,41H,42H,42H,42H,42H,42H,42H,42H,42H,42H	7EH	B7H
Inverter Addr.	Read Function	Amount of Bytes	Data	CRC Verification Code	

Serial Number is AAAAAAABBBBBBBB (Just as a sample)

7.4 Set Reconnect Time

AP sends:

01H	10H	00H	01H	00H,01H	02H	00H	3CH	A7H	90H
Inverter Address	Function Code	First Addr. of register		Amount of	Amount of data	Data		CRC Verification Code	

Data is 60 and unit is 1s, so actual setting is 60s.

Inverter response:

01H	10H	00H,01H	00H,01H	50H	09H
Inverter Address	Function Code	First Addr. of register	Amount of registers	CRC Verification Code	

7.5 Set Lowest PV voltage for feeding power

AP sends:

01H	10H	00H	00H	00H,01H	02H	0AH	F0H	A0H	B4H
Inverter Address	Function Code	First Address of register		Amount of	Amount of data	Data		CRC Verification Code	

Data is 2800 and unit is 0.1v, so actual setting is 280.0v.

Inverter response:

01H	10H	00H	00H	00H,01H	01H	C9H
Inverter Address	Function Code	First Address of register		Amount of registers	CRC Verification Code	

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

```

const INT8U auchCRCLo[] = { 0x00, 0xC0, 0xC1, 0x01, 0xC3, 0x03, 0x02, 0xC2, 0xC6, 0x06, 0x07, 0xC7, 0x05, 0xC5,
0xC4, 0x04, 0xCC, 0x0C, 0x0D, 0xCD, 0x0F, 0xCF, 0xCE, 0x0E, 0x0A, 0xCA, 0xCB, 0x0B, 0xC9, 0x09, 0x08,
0xC8,0xD8, 0x18, 0x19, 0xD9, 0x1B, 0xDB, 0xDA, 0x1A, 0x1E, 0xDE, 0xDF, 0x1F, 0xDD, 0x1D, 0x1C, 0xDC,0x14,
0xD4, 0xD5, 0x15, 0xD7, 0x17, 0x16, 0xD6, 0xD2, 0x12, 0x13, 0xD3, 0x11, 0xD1, 0xD0, 0x10,0xF0, 0x30, 0x31, 0xF1,
0x33, 0xF3, 0xF2, 0x32, 0x36, 0xF6, 0xF7, 0x37, 0xF5, 0x35, 0x34, 0xF4, 0x3C, 0xFC, 0xFD, 0x3D, 0xFF, 0x3F, 0x3E,
0xFE, 0xFA, 0x3A, 0x3B, 0xFB, 0x39, 0xF9, 0xF8, 0x38, 0x28, 0xE8, 0xE9, 0x29, 0xEB, 0x2B, 0x2A, 0xEA, 0xEE,
0x2E, 0x2F, 0xEF, 0x2D, 0xED, 0xEC, 0x2C,0xE4, 0x24, 0x25, 0xE5, 0x27, 0xE7, 0xE6, 0x26, 0x22, 0xE2, 0xE3, 0x23,
0xE1, 0x21, 0x20, 0xE0,0xA0, 0x60, 0x61, 0xA1, 0x63, 0xA3, 0xA2, 0x62, 0x66, 0xA6, 0xA7, 0x67, 0xA5, 0x65, 0x64,
0xA4,0x6C, 0xAC, 0xAD, 0x6D, 0xAF, 0x6F, 0x6E, 0xAE, 0xAA, 0x6A, 0x6B, 0xAB, 0x69, 0xA9, 0xA8, 0x68,0x78,
0xB8, 0xB9, 0x79, 0xBB, 0x7B, 0x7A, 0xBA, 0xBE, 0x7E, 0x7F, 0xBF, 0x7D, 0xBD, 0xBC, 0x7C,0xB4, 0x74, 0x75,
0xB5, 0x77, 0xB7, 0xB6, 0x76, 0x72, 0xB2, 0xB3, 0x73, 0xB1, 0x71, 0x70, 0xB0,0x50, 0x90, 0x91, 0x51, 0x93, 0x53,
0x52, 0x92, 0x96, 0x56, 0x57, 0x97, 0x55, 0x95, 0x94, 0x54,0x9C, 0x5C, 0x5D, 0x9D, 0x5F, 0x9F, 0x9E, 0x5E, 0x5A,
0x9A, 0x9B, 0x5B, 0x99, 0x59, 0x58, 0x98,0x88, 0x48, 0x49, 0x89, 0x4B, 0x8B, 0x8A, 0x4A, 0x4E, 0x8E, 0x8F, 0x4F,
INT16U sCRC16(INT8U *puchMsg, INT16U usDataLen)
{
INT8U uchCRCHi = 0xFF ; // Initialization INT8U uchCRCLo = 0xFF ; // Initialization INT8U uIndex;
While (usDataLen--)
{
uIndex = uchCRCHi ^ *puchMsg++ ; //Calculate CRC uchCRCHi = uchCRCLo ^ auchCRCHi[uIndex] ;
uchCRCLo = auchCRCLo[uIndex] ;
}
return ((INT16U)uchCRCHi << 8 | uchCRCLo) ;
}

```