

KSTAR Hybrid Inverter

MODBUS RS485 Communication Protocol V2.5

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revised version	modify content	author	Date
V1.0	Add KSE hybrid inverter		2020.04.17
V1.1	Modify the overfrequency, overvoltage, and undervoltage ranges		2020.12.31
V1.2	03 Querying Function Codes is added		2021.01.15
V1.3	Add Brazil, South Africa, 50549 and other standards		2021.02.03
V1.4	Charge and discharge quantity of newly added batteries in the day (3,294, 3,301)		2021.04.06
V1.5	Modify PV, buy power, sell power, load power unit of the day: changed from 1kwh to 0.1kwh;		2021.04.28
V1.6	Added the maximum temperature of the battery pack and the cumulative time of the		2021.05.26
V1.7	Add PV power from grid-connected on the same day; One-day charging comes from PV power; The daily load comes from battery power consumption;		2021.10.12
V1.8	Added five battery packs (addresses 3441 to 3660)		2021.11.04
V1.9	Added advanced peak load filling function, off-grid battery discharge depth, generator mode, battery pack forced wake up, manually open the heating film, CT direction		2021.11.16
V2.0	Added grid standard subdivision, AC coupling enable, BMS discharge depth enable; grid standard added Israel, Poland, Chile		2022.02.16
V2.1	Added Charge from grid MAX SOC , GFCI Check Enable,VRTEnable,Warning:Bms_Updating,Bms_VersionErr, Bms_UpdateFail		2022.02.23
V2.2	Add parameters corresponding to phase S and T		2022.04.02
V2.3	Supplemental English translation of battery pack parameters;		2022.07.29
V2.4	Table 3.1.5 Newly added three-phase models; Indicate the register data only available for three-phase models;		2022.08.17 2022.08.18
V2.5	Newly added registers for three-phase models: PV temperature, LLC temperature; Battery pack 6, 7 and 8 information; DSP2 version number and test version number.		2022.11.17

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1. General Protocol

1.1. Overview of the Protocol

This paper has stipulated the protocol specification for communication between our company's hybrid inverter and PC. This specification is a subset of the MODBUS protocol. The MODBUS protocol standard specification is not described in this document. Please refer to the standard MODBUS RTU protocol format: see www.modicon.com.

1.2. Communication Interface

The serial communication port uses standard RS485. The information transmission mode is asynchronous, with 1 bit of start bit, 8 bits of data bit, 1 bit of stop bit, and no parity bit. The data transfer baud rate defaults to 9600bps, 2400/4800/9600 is optional. The transmission uses "big-Endian", such as transmission 0x12345678, first send 0x12, then 0x34, then 0x56, finally 0x78.

1.3. Communication method

The PC (host) and the inverter (slave) adopt the master-slave simplex communication mode. Up to 32 slaves can be connected to the 485 bus. The master polls each slave. If the slave does not respond or receives in response to the error message, the communication process is considered to have failed.

2. Protocol frame

2.1. Protocol frame format

Byte number	0	1	N	N+1	N+2
Bytes	1	1		2	
Content	Slave address	Function	Data	Check code	
Format	ID	FUNC	ADDR	CRC	

2.2. Protocol Frame Description

2.2.1 ID

Slave (module power) address, value range 0-32. 0 is the broadcast address, the slave address is unique on the Modbus bus.

2.2.2 FUNC

FUNC	Meaning
0x03	Read holding register to query inverter information
0x04	Read input register to query inverter information

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0x06	Write a single register and execute a remote instruction
0x10	Write multiple registers and set the inverter information

Error code	
Error code	Meaning
0x01	Invalid function code
0x02	Invalid address code
0x03	Invalid value
0x06	Slave busy ,invalid command

2.3.3 CRC

The master or slave can use the CRC check code to determine if the received information is correct. Due to electronic noise or some other interference on the bus, information may be wrong during transmission. The receiving party can use the CRC check code to judge whether the received information frame is correct and give up the wrong information frame, which improves the communication system. Safety and reliability.

The CRC (Redundant Cyclic Code) of the MODBUS communication protocol contains 2 bytes, which is a 16-bit binary number. The transmitting device calculates the CRC code and places it at the end of the transmitted information frame. The device receiving the information recalculates the CRC code for all the received information (including the CRC code) and determines whether the CRC code is 0. If it is 0, it indicates that the received information frame is correct, otherwise it indicates that the received information frame is incorrect.

Only 8 data bits are used in the CRC calculation. The start and stop bits are not involved in the CRC calculation.

● The calculation method of the CRC code is:

1. Preset one 16-bit register to be hexadecimal FFFF (that is, all 1); call this register as CRC register;
2. Put the first 8-bit binary data (the first byte of the communication message frame) with the lower of the 16-bit CRC register 8-bit distinct OR, put the result in the CRC register;
3. Move the contents of the CRC register one bit to the right (toward the low) to fill the highest bit with 0, and check the shifted out bit after the right shift;
4. If the shift bit is 0: repeat step 3 (shift one bit to the right); If the shift bit is 1: the CRC register is XORed with the polynomial A001 (1010 0000 0000 0001);
5. Repeat steps 3 and 4 until you shift 8 times to the right, so that the entire 8-bit data is processed.
6. Repeat steps 2 through 5 to process the next byte of the communication information frame.
7. After all the bytes of the communication information frame are calculated as described above, the high and low bytes of the obtained 16-bit CRC register are exchanged;
8. The final CRC register content is: CRC code.

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3. Inverter Information Address Table

3.1. Inverter basic information (04H Read)

Table 3.1.1

Register Address	Item	Byte	Byte No.	Unit	Data Type	Remark	FUNC
3000	PV1 Input Vlot	2	0	0.1V	U16		04H
3001	PV2 Input Vlot	2	2	0.1V	U16		04H
3002~3011	Reserved	20	4				04H
3012	PV1 Input Curr	2	24	0.01A	S16		04H
3013	PV2 Input Curr	2	26	0.01A	S16		04H
3014~3023	Reserved	20	28				04H
3024	PV1 Input Power	2	48	1W	S16		04H
3025	PV2 Input Power	2	50	1W	S16		04H
3026~3035	Reserved	20	52				04H
3036	Day Energy (PV)	2	72	0.1Kwh	U16		04H
3037	Month Energy (PV)	4	74	Kwh	U32		04H
3038							04H
3039	Year Energy (PV)	4	78	Kwh	U32		04H
3040							04H
3041	Total Energy (PV)	4	82	0.1Kwh	U32		04H
3042							04H
3043	Reserved	2	86				04H
3044	Inverter working mode	2	88		U16	0: SELF CSM 1: PEAK SFT 2: BAT PRIO	04H/06H
3045	Inverter Model	2	90		U16	Table 3.1.5	04H
3046	SYS_STATE	2	92		U16	Table 3.1.4	04H
3047	INV_STATE	2	94		U16	Table 3.1.10	04H
3048	DCDC_STATE	2	96		U16	Table 3.1.11	04H
3049	DSP alarm code	4	98		U32	Table 3.1.2	04H
3050							04H
3051	DSP error code	4	102		U32	Table 3.1.3	04H
3052							04H
3053	BUS Volt	2	106	0.1V	U16		04H

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3054	DCBUS Vlot	2	108	0.1V	U16		04H
3055	INV radiator temp	2	110	0.1℃	S16		04H
3056	BAT radiator temp	2	112	0.1℃	S16		04H
3057	Inside environment	2	114	0.1℃	S16		04H
3058	Reserved	2	116		U16		04H
3059	Discharge Depth Enable	2	118		U16	0: Disable 1:Enable Default: 1	04H/06H
3060	BMS DOD Enable	2	120		U16	0: Disable 1:Enable Default: 0	04H/06H
3061	OffGrid DOD	2	122	Unit: %	U16	Range:5~90 Default: 90	04H/06H
3062	BAT Type	2	124		U16		04H
3063	BAT Volt	2	126	0.01V	U16		04H
3064	BAT Current	2	128	0.1A	S16		04H
3065	BAT CHG/DISCHG Power	2	130	1W	S16		04H
3066	BAT_SOC	2	132	0.10%	U16		04H
3067	BAT_Temp	2	134	0.1℃	S16		04H
3068	OnGrid DISC-DEPTH	2	136	%	U16	Range:10~95 Default: 90	04H/06H
3069	BAT_CHG_VOLT	2	138	0.1V	U16		04H
3070	BAT_CHG_LIMIT_CURR	2	140	1A	U16		04H
3071	BAT_DISCHG_LIMIT_CURR	2	142	1A	U16		04H
3072	Min Bat DisChg Volt	2	144	0.1V	U16		04H/06H
3073	Max Bat Chg Volt	2	146	0.1V	U16		04H/06H
3074	BAT_CAP_AH	2	148	Ah	U16	Table 3.4.7	04H/06H
3075	BAT Health		150	0.10%	U16		04H
3076	BAT State-Code	2	152		U16	Reserved	04H
3077	Number of battery packs	2	154		U16		04H
3078	BAT Dischg Power Set	2	156	%	U16	0-100	04H/06H
3079	BAT Charge Power Set	2	158	%	U16	0-100	04H/06H
3080	BAT_SET_FLOAT_VOLT	2	160	0.1V	U16		04H/06H
3081	BAT_SET_AVERA_VOLT	2	162	0.1V	U16		04H/06H
3082	BAT_SET_CHG_CURR	2	164	1A	U16		04H/06H
3083	Wake-up BMS Enb	2	166		U16	0:Disable 1:Enable	04H/06H

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3084	Wake-up BMS Time	2	168	min	U16	5~300	04H/06H
3085	Reserve	2	170		U16		04H
3086	Force Chg/Dischg Enb	2	172		U16	0: Invalid 1: Charge 2: Discharge	04H/06H
3087~3096	Reserved	4					04H
3097	R Phase Grid Volt	2	194	0.1V	U16		04H
3098	R Phase Grid Freq	2	196	0.01Hz	U16		04H
3099	R Phase Meter Curr	2	198	0.001A	S16		04H
3100	R Phase Meter Power	2	200	1W	S16		04H
3101	S Phase Grid Volt	2	202	0.1V	U16	Only for Three Phase Model (refer to 3.1.5)	04H
3102	S Phase Grid Freq	2	204	0.01Hz	U16		04H
3103	S Phase Meter Curr	2	206	0.001A	S16		04H
3104	S Phase Meter Power	2	208	1W	S16		04H
3105	T Phase Grid Volt	2	210	0.1V	U16		04H
3106	T Phase Grid Freq	2	212	0.01Hz	U16		04H
3107	T Phase Meter Curr	2	214	0.001A	S16		04H
3108	T Phase Meter Power	2	216	1W	S16		04H
3109	Day Energy (BUY)	2	218	0.1Kwh	U16		04H
3110	Month Energy (BUY)	4	220	Kwh	U32		04H
3111							04H
3112	Year Energy (BUY)	4	224	Kwh			04H
3113							04H
3114	Total Energy (BUY)	4	228	0.1Kwh			04H
3115							04H
3116	Day Energy (SELL)	2	232	0.1Kwh	U16		04H
3117	Month Energy (SELL)	4	234	Kwh	U32		04H
3118							04H
3119	Year Energy (SELL)	4	238	Kwh	U32		04H
3120							04H
3121	Total Energy (SELL)	4	242	0.1Kwh	U32		04H
3122							04H
3123	R-INV_Vlot	2	246	0.1V	U16		04H
3124	R-INV_Curr	2	248	0.01A	S16		04H
3125	R-INV_Freq	2	250	0.01Hz	U16		04H

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3126	R-INV_Power	2	252	1W	S16		04H
3127	S-INV_Vlot	2	254	0.1V	U16	Only for Three Phase Model (refer to 3.1.5)	04H
3128	S-INV_Curr	2	256	0.01A	S16		04H
3129	S-INV_Freq	2	258	0.01Hz	U16		04H
3130	S-INV_Power	2	260	1W	S16		04H
3131	T-INV_Vlot	2	262	0.1V	U16		04H
3132	T-INV_Curr	2	264	0.01A	S16		04H
3133	T-INV_Freq	2	266	0.01Hz	U16		04H
3134	T-INV_Power	2	268	1W	S16		04H
3135	R-BackUp Volt	2	270	0.1V	U16		
3136	R-BackUp Curr	2	272	0.01A	U16		04H
3137	R-BackUp Power	2	274	1W	U16		04H
3138	S-BackUp Volt	2	276	0.1V	U16	Only for Three Phase Model (refer to 3.1.5)	04H
3139	S-BackUp Curr	2	278	0.01A	U16		04H
3140	S-BackUp Power	2	280	1W	U16		04H
3141	T-BackUp Volt	2	282	0.1V	U16		04H
3142	T-BackUp Curr	2	284	0.01A	U16		04H
3143	T-BackUp Power	2	286	1W	U16		04H
3144	R-Load Power	2	288	1W	U16		04H
3145	S-Load Power	2	290	1W	U16	Only for Three Phase Model (refer to 3.1.5)	04H
3146	T-Load Power	2	292	1W	U16		04H
3147	Day Energy (LOAD)	2	294	0.1Kwh	U16		04H
3148	Month Energy (LOAD)	4	296	Kwh	U32		04H
3149							04H
3150	Year Energy (LOAD)	4	300	Kwh	U32		04H
3151							04H
3152	Total Energy (LOAD)	4	304	0.1Kwh	U32		04H
3153							04H
3154	On_GRID_COUNT	4	308		U32		04H
3155							04H
3156	PV Temperature	2	312	0.1℃	S16	Only for Three Phase Model	04H
3157	LLC Temperature	2	314	0.1℃	S16		04H
3158	Reserved	2	316				04H
3159	Reserved	2	318				04H

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3160	Charge_START_TIME-1	4	320	ASCII char	U32	Table 3.3.3	04H
3161							04H
3162	Charge_END_TIME-1	4	324	ASCII char	U32	Table 3.3.3	04H
3163							04H
3164	Discharge_START_TIME-1	4	328	ASCII char	U32	Table 3.3.3	04H
3165							04H
3166	Discharge_END_TIME-1	4	332	ASCII char	U32	Table 3.3.3	04H
3167							04H
3168	Charge_START_TIME-2	4	336	ASCII char	U32	Table 3.3.3	04H
3169							04H
3170	Charge_END_TIME-2	4	340	ASCII char	U32	Table 3.3.3	04H
3171							04H
3172	Discharge_START_TIME-2	4	344	ASCII char	U32	Table 3.3.3	04H
3173							04H
3174	Discharge_END_TIME-2	4	348	ASCII char	U32	Table 3.3.3	04H
3175							04H
3176	Timing Charge/Discharge	2	352		U16	Table 3.1.12	04H
3177	Reserved	2	354				04H
3178	Reserved	2	356				04H
3179	PV Input Mode	2	358		U16	Table 3.1.8	04H/06H
3180	Reserved	2	360				04H
3181	DRM Enable	2	362		U16	0:Disable 1:Enable	04H/06H
3182	AntiReflux Enable	2	364		U16	0:Disable 1:Enable	04H/06H
3183	AntiReflux Value	2	366		U16		04H/06H
3184	BackUp Output Enable	2	368		U16	0:Disable 1:Enable	04H/06H
3185	Remote Enable	2	370		U16	0:Disable 1:Enable	04H/06H
3186	Boot Delay	2	372	S	U16	10-300	04H/06H
3187	Remote off State	2	374		U16	1: off State 0:Normal	04H
3188~3192	Reserved	10	376				04H
3193	Grid Standard	2	386		U16	Table 3.1.9	04H/06H
3194	ARM error Code	2	388		U16	Table 3.1.7	04H
3195	Reactive power setting	2	390	%	S16	Table 3.4.4	04H/06H
3196	Reserved	2	392				04H

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3197	Reactive power control	2	394		U16	Table 3.4.5	04H/06H
3198	Reserved	2	396				04H
3199	Power factor setting	2	398		S16	Table 3.4.2	04H/06H
3200	Active power setting	2	400	%	U16	Table 3.4.3	04H/06H
3201	Min Grid voltage	2	402	0.1V	U16		04H/06H
3202	Max Grid Vlot	2	404	0.1V	U16		04H/06H
3203	Min Grid Freq	2	406	0.01Hz	U16		04H/06H
3204	Max Grid Freq	2	408	0.01 Hz	U16		04H/06H
3205	Bypass Volt-Min	2	410	0.1V	U16		04H/06H
3206	Bypass Volt-Max	2	412	0.1V	U16		04H/06H
3207	Bypass Freq-Min	2	414	0.01Hz	U16		04H/06H
3208	Bypass Freq-Max	2	416	0.01 Hz	U16		04H/06H
3209	Over Volt derate Enable	2	418		U16	0:Disable 1:Enable	04H/06H
3210	Over Freq derate Enable	2	420		U16	0:Disable 1:Enable	04H/06H
3211	Under Volt derate Enable	2	422		U16	0:Disable 1:Enable	04H/06H
3212	Under Freq derate Enable	2	424		U16	0:Disable 1:Enable	04H/06H
3213	Volt Over derate Start	2	426	1 V	U16		04H/06H
3214	Freq Over derate Start	2	428	0.01Hz	U16		04H/06H
3215	Under Volt derate Start (Charging)	2	430	1 V	U16		04H/06H
3216	Under Freq derate Start (Charging)	2	432	0.01Hz	U16		04H/06H
3217	R-Voltage calibration factor	2	434		U16	Default: 4096	04H/06H
3218	Reserved	2	436		U16	Default: 4096	04H
3219	Reserved	2	438		U16	Default: 4096	04H
3220	R-Voltage calibration factor	2	440		U16	Default: 4096	04H/06H
3221	Reserved	2	442		U16	Default: 4096	04H
3222	Reserved	2	444		U16	Default: 4096	04H
3223	Battery/Voltage calibration factor	2	446		U16	Default: 4096	04H/06H
3224~3226	Reserved		448				04H
3227	DSP version	1	454		U8	10 refer to V1.0	04H
	ARM version	1	455		U8	10 refer to V1.0	04H
3228-3238	Inverter SN Number	22	456		U8 ASCII char		04H

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3239	Year	2	478	BCD code	U16	0x20 represent 2020	04H
3240	Month	2	480	BCD code	U16	0x10 represent 10	04H
3241	Date	2	482	BCD code	U16	0x30 represent 30	04H
3242	Hour	2	484	BCD code	U16	0x21 represent 21	04H
3243	Minute	2	486	BCD code	U16	0x59 represent 59	04H
3244	Second	2	488	BCD code	U16	0x59 represent 59	04H
3245	Week	2	490	BCD code	U16	0x01 represent 1	04H
3246~3250	Reserved						04H
3251	generator mode is enabled	2			U16	0 disable 1 enable	04H/06H
3252	Island effect enabled	2			U16	0 disable 1 enable	04H/06H
3253	Battery pack Forcibly wakes up	2			U16	0 disable 1 enable	04H/06H
3254	Manually open the heating film	2			U16	0: Heating film temperature control 1: Manually open the heating film 2: Manually close the heating film	04H/06H
3255	CT direction	2			U16	0: positive 1: negative	04H/06H
3256	PV1CurrCalibrate	2			U16	Range: 3687~4505 Default: 4096	04H/06H
3257	PV2CurrCalibrate	2			U16	Range: 3687~4505 Default: 4096	04H/06H
3258	Grid Subdivide	2		表 3.1.9.1	U16	Range: 0~7 Default: 0	04H/06H
3259	AC Couple	2			U16	0: Disable 1:Enable Default: 1	04H/06H
3260	Charge from grid MAX SOC	2		%	U16	Range: 20~100 Default: 100	04H/06H
3261	Maintain Minimum SOC Enable	2			U16	0: Disable 1:Enable Default: 1	04H/06H
3262	GFCI Check Enable	2			U16	0: Disable 1:Enable Default: 1	04H/06H

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3263	VRT Enable	2			U16	0: Disable 1:Enable Default: 1	04H/06H
3264	CT Or Meter				U16	0: CT 1:Meter Default: 0	04H/06H
3265	Meter Brand				U16	0: Acrel 1: Estron Default: 0	04H/06H
3272~3291	Reserved						
3292	Total battery discharge	4		Kwh	U32		04H
3293							04H
3294	Daily battery discharge	2		0.1Kwh	U16		04H
3295	Reserved	4		Kwh	U32		04H
3296							04H
3297	Reserved	4		Kwh	U32		04H
3298							04H
3299	Total battery charge	4		Kwh	U32		04H
3300							04H
3301	Daily battery charge	2		0.1Kwh	U16		04H
3302~3312	Reserved						04H
3313	Advanced peak cutting and valley filling function	2				Bit0 0 disable 1 enable Bit1 Monday 0-disable 1-enable Bit2 Tuesday Bit7 Sunday Bit8	04H/06H
3314	Self-Consumption Charge Enable	2				0:Disable 1:Enable	04H/06H
3317	Self-Consumption Charge Start Time	2				0x071E -> 7:30 am	04H/06H
3318	Self-Consumption Charge End Time	2				0x071E -> 7:30 am	04H/06H
3389~3440	reserve						
3441	PACKAdd		Pack1		U16		04H
3442	PACKWarFlag		Pack1		U16	description-1	04H
3443	PACKProtectFlag		Pack1		U16	description-2	04H

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3444	PACKStatusFaultFlag		Pack1		U16	description-3	04H
3445	PackBatVolt		Pack1	0.01V	U16		04H
3446	PACKCur		Pack1	0.01A	S16		04H
3447	PACKBalanceStatus		Pack1		U16		04H
3448	PACKBatCycCnt		Pack1		U16		04H
3449	PACKSOH		Pack1	%	U16	0~100	04H
3450	PACKSOC		Pack1	%	U16	0~100	04H
3451	AccUseTimeOverTemper		Pack1		U16		04H
3452	PackOnline		Pack1		U16	0:Off line 1:Online	04H
3453	Reserve		Pack1		U16		04H
3454	PACKDesignCapactiy		Pack1	mAh*100	U16		04H
3455	PACK ResidualCapacity		Pack1	Ah	U16		04H
3456	PACKTotalCapacity		Pack1	mAh*100	U16		04H
3457	PACKDischargPowSum		Pack1	KWH	U16		04H
3458	PACKChargPowSum		Pack1	KWH	U16		04H
3459	PACKHeatingRequest		Pack1		U16	1: Request heating 0:Heating not requested	04H
3460	PACKCellAveTemper		Pack1	0.1°C	S16		04H
3461	PACKCellMaxTemper		Pack1	0.1°C	S16		04H
3462	PACKCellMinTemper		Pack1	0.1°C	S16		04H
3463	PACKMosfetAveTempe		Pack1	0.1°C	S16		04H
3464	PACKMosfetMaxTempe		Pack1	0.1°C	S16		04H
3465	PACKMosfetMinTempe		Pack1	0.1°C	S16		04H
3466	PACKEnvirAveTemper		Pack1	0.1°C	S16		04H
3467	PACKEnvirMaxTemper		Pack1	0.1°C	S16		04H
3468	PACKEnvirMinTemper		Pack1	0.1°C	S16		04H
3469	Ave cell voltage		Pack1	0.01V	U16		04H
3470	Maximum cell voltage		Pack1	0.01V	U16		04H
3471	Minimum cell voltage		Pack1	0.01V	U16		04H
3472	BMSVersion order0-1		Pack1	ASCII	U16		04H
3473	BMSVersion order2-3		Pack1	ASCII	U16		04H
3474	BMSVersion order4-5		Pack1	ASCII	U16		04H
3475~3484	reserve 预留						
3485	PACKAdd		Pack2		U16		04H
3486	PACKWarFlag		Pack2		U16	description-1	04H

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3487	PACKProtectFlag		Pack2		U16	description-2	04H
3488	PACKStatusFaultFlag		Pack2		U16	description-3	04H
3489	PackBatVolt		Pack2	0.01V	U16		04H
3490	PACKCur		Pack2	0.01A	S16		04H
3491	PACKBalanceStatus		Pack2		U16		04H
3492	PACKBatCycCnt		Pack2		U16		04H
3493	PACKSOH		Pack2	%	U16	0~100	04H
3494	PACKSOC		Pack2	%	U16	0~100	04H
3495	AccUseTimeOverTemper		Pack2		U16		04H
3496	PackOnline		Pack2		U16	0:Off line 1:Online	04H
3497	Reserve		Pack2		U16		04H
3498	PACKDesignCapactiy		Pack2	mAh*100	U16		04H
3499	PACK ResidualCapacity		Pack2	Ah	U16		04H
3500	PACKTotalCapacity		Pack2	mAh*100	U16		04H
3501	PACKDischargPowSum		Pack2	KWH	U16		04H
3502	PACKChargPowSum		Pack2	KWH	U16		04H
3503	PACKHeatingRequest		Pack2		U16	1: Request heating 0:Heating not requested	04H
3504	PACKCellAveTemper		Pack2	0.1°C	S16		04H
3505	PACKCellMaxTemper		Pack2	0.1°C	S16		04H
3506	PACKCellMinTemper		Pack2	0.1°C	S16		04H
3507	PACKMosfetAveTempe		Pack2	0.1°C	S16		04H
3508	PACKMosfetMaxTempe		Pack2	0.1°C	S16		04H
3509	PACKMosfetMinTempe		Pack2	0.1°C	S16		04H
3510	PACKEnvirAveTemper		Pack2	0.1°C	S16		04H
3511	PACKEnvirMaxTemper		Pack2	0.1°C	S16		04H
3512	PACKEnvirMinTemper		Pack2	0.1°C	S16		04H
3513	Ave cell voltage		Pack2	0.01V	U16		04H
3514	Maximum cell voltage		Pack2	0.01V	U16		04H
3515	Minimum cell voltage		Pack2	0.01V	U16		04H
3516	BMSVersion order0-1		Pack2	ASCII	U16		04H
3517	BMSVersion order2-3		Pack2	ASCII	U16		04H
3518	BMSVersion order4-5		Pack2	ASCII	U16		04H
3519~3528	reserve						04H
3529	PACKAdd		Pack3		U16		04H

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3530	PACKWarFlag		Pack3		U16	description-1	04H
3531	PACKProtectFlag		Pack3		U16	description-2	04H
3532	PACKStatusFaultFlag		Pack3		U16	description-3	04H
3533	PackBatVolt		Pack3	0.01V	U16		04H
3534	PACKCur		Pack3	0.01A	S16		04H
3535	PACKBalanceStatus		Pack3		U16		04H
3536	PACKBatCycCnt		Pack3		U16		04H
3537	PACKSOH		Pack3	%	U16	0~100	04H
3538	PACKSOC		Pack3	%	U16	0~100	04H
3539	AccUseTimeOverTemper		Pack3		U16		04H
3540	PackOnline		Pack3		U16	0:Off line 1:Online	04H
3541	Reserve		Pack3		U16		04H
3542	PACKDesignCapacity		Pack3	mAh*100	U16		04H
3543	PACK ResidualCapacity		Pack3	Ah	U16		04H
3544	PACKTotalCapacity		Pack3	mAh*100	U16		04H
3545	PACKDischargPowSum		Pack3	KWH	U16		04H
3546	PACKChargPowSum		Pack3	KWH	U16		04H
3547	PACKHeatingRequest		Pack3		U16	1: Request heating 0:Heating not requested	04H
3548	PACKCellAveTemper		Pack3	0.1°C	S16		04H
3549	PACKCellMaxTemper		Pack3	0.1°C	S16		04H
3550	PACKCellMinTemper		Pack3	0.1°C	S16		04H
3551	PACKMosfetAveTempe		Pack3	0.1°C	S16		04H
3552	PACKMosfetMaxTempe		Pack3	0.1°C	S16		04H
3553	PACKMosfetMinTempe		Pack3	0.1°C	S16		04H
3554	PACKEnvirAveTemper		Pack3	0.1°C	S16		04H
3555	PACKEnvirMaxTemper		Pack3	0.1°C	S16		04H
3556	PACKEnvirMinTemper		Pack3	0.1°C	S16		04H
3557	Ave cell voltage		Pack3	0.01V	U16		04H
3558	Maximum cell voltage		Pack3	0.01V	U16		04H
3559	Minimum cell voltage		Pack3	0.01V	U16		04H
3560	BMSVersion order0-1		Pack3	ASCII	U16		04H
3561	BMSVersion order2-3		Pack3	ASCII	U16		04H
3562	BMSVersion order4-5		Pack3	ASCII	U16		04H
3563~3572	reserve						04H

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3573	PACKAdd		Pack4		U16		04H
3574	PACKWarFlag		Pack4		U16	description-1	04H
3575	PACKProtectFlag		Pack4		U16	description-2	04H
3576	PACKStatusFaultFlag		Pack4		U16	description-3	04H
3577	PackBatVolt		Pack4	0.01V	U16		04H
3578	PACKCur		Pack4	0.01A	S16		04H
3579	PACKBalanceStatus		Pack4		U16		04H
3580	PACKBatCycCnt		Pack4		U16		04H
3581	PACKSOH		Pack4	%	U16	0~100	04H
3582	PACKSOC		Pack4	%	U16	0~100	04H
3583	AccUseTimeOverTemper		Pack4		U16		04H
3584	PackOnline		Pack4		U16	0:Off line 1:Online	04H
3585	Reserve		Pack4		U16		04H
3586	PACKDesignCapacity		Pack4	mAh*100	U16		04H
3587	PACK ResidualCapacity		Pack4	Ah	U16		04H
3588	PACKTotalCapacity		Pack4	mAh*100	U16		04H
3589	PACKDischargPowSum		Pack4	KWH	U16		04H
3590	PACKChargPowSum		Pack4	KWH	U16		04H
3591	PACKHeatingRequest		Pack4		U16	1: Request heating 0:Heating not requested	04H
3592	PACKCellAveTemper		Pack4	0.1°C	S16		04H
3593	PACKCellMaxTemper		Pack4	0.1°C	S16		04H
3594	PACKCellMinTemper		Pack4	0.1°C	S16		04H
3595	PACKMosfetAveTempe		Pack4	0.1°C	S16		04H
3596	PACKMosfetMaxTempe		Pack4	0.1°C	S16		04H
3597	PACKMosfetMinTempe		Pack4	0.1°C	S16		04H
3598	PACKEnvirAveTemper		Pack4	0.1°C	S16		04H
3599	PACKEnvirMaxTemper		Pack4	0.1°C	S16		04H
3600	PACKEnvirMinTemper		Pack4	0.1°C	S16		04H
3601	Ave cell voltage		Pack4	0.01V	U16		04H
3602	Maximum cell voltage		Pack4	0.01V	U16		04H
3603	Minimum cell voltage		Pack4	0.01V	U16		04H
3604	BMSVersion order0-1		Pack4	ASCII	U16		04H
3605	BMSVersion order2-3		Pack4	ASCII	U16		04H
3606	BMSVersion order4-5		Pack4	ASCII	U16		04H

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3607~3616	reserve						04H
3617	PACKAdd		Pack5		U16		04H
3618	PACKWarFlag		Pack5		U16	description-1	04H
3619	PACKProtectFlag		Pack5		U16	description-2	04H
3620	PACKStatusFaultFlag		Pack5		U16	description-3	04H
3621	PackBatVolt		Pack5	0.01V	U16		04H
3622	PACKCur		Pack5	0.01A	S16		04H
3623	PACKBalanceStatus		Pack5		U16		04H
3624	PACKBatCycCnt		Pack5		U16		04H
3625	PACKSOH		Pack5	%	U16	0~100	04H
3626	PACKSOC		Pack5	%	U16	0~100	04H
3627	AccUseTimeOverTemper		Pack5		U16		04H
3628	PackOnline		Pack5		U16	0:Off line 1:Online	04H
3629	Reserve		Pack5		U16		04H
3630	PACKDesignCapacity		Pack5	mAh*100	U16		04H
3631	PACK ResidualCapacity		Pack5	Ah	U16		04H
3632	PACKTotalCapacity		Pack5	mAh*100	U16		04H
3633	PACKDischargPowSum		Pack5	KWH	U16		04H
3634	PACKChargPowSum		Pack5	KWH	U16		04H
3635	PACKHeatingRequest		Pack5		U16	1: Request heating 0:Heating not requested	04H
3636	PACKCellAveTemper		Pack5	0.1°C	S16		04H
3637	PACKCellMaxTemper		Pack5	0.1°C	S16		04H
3638	PACKCellMinTemper		Pack5	0.1°C	S16		04H
3639	PACKMosfetAveTempe		Pack5	0.1°C	S16		04H
3640	PACKMosfetMaxTempe		Pack5	0.1°C	S16		04H
3641	PACKMosfetMinTempe		Pack5	0.1°C	S16		04H
3642	PACKEnvirAveTemper		Pack5	0.1°C	S16		04H
3643	PACKEnvirMaxTemper		Pack5	0.1°C	S16		04H
3644	PACKEnvirMinTemper		Pack5	0.1°C	S16		04H
3645	Ave cell voltage		Pack5	0.01V	U16		04H
3646	Maximum cell voltage		Pack5	0.01V	U16		04H
3647	Minimum cell voltage		Pack5	0.01V	U16		04H
3648	BMSVersion order0-1		Pack5	ASCII	U16		04H
3649	BMSVersion order2-3		Pack5	ASCII	U16		04H

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3650	BMSVersion order4-5		Pack5	ASCII	U16		04H
3651~3660	Reserve						
(Note: Pack 6、7、8 only for three phase model, unreadable on single phase model)							
3661	PACKAdd		Pack6		U16		04H
3662	PACKWarFlag		Pack6		U16	description-1	04H
3663	PACKProtectFlag		Pack6		U16	description-2	04H
3664	PACKStatusFaultFlag		Pack6		U16	description-3	04H
3665	PackBatVolt		Pack6	0.01V	U16		04H
3666	PACKCur		Pack6	0.01A	S16		04H
3667	PACKBalanceStatus		Pack6		U16		04H
3668	PACKBatCycCnt		Pack6		U16		04H
3669	PACKSOH		Pack6	%	U16	0~100	04H
3670	PACKSOC		Pack6	%	U16	0~100	04H
3671	AccUseTimeOverTemper		Pack6		U16		04H
3672	PackOnline		Pack6		U16	0:Off line 1:Online	04H
3673	Reserve		Pack6		U16		04H
3674	PACKDesignCapactiy		Pack6	mAh*100	U16		04H
3675	PACK ResidualCapacity		Pack6	Ah	U16		04H
3676	PACKTotalCapacity		Pack6	mAh*100	U16		04H
3677	PACKDischargPowSum		Pack6	KWH	U16		04H
3678	PACKChargPowSum		Pack6	KWH	U16		04H
3679	PACKHeatingRequest		Pack6		U16	1: Request heating 0:Heating not requested	04H
3680	PACKCellAveTemper		Pack6	0.1°C	S16		04H
3681	PACKCellMaxTemper		Pack6	0.1°C	S16		04H
3682	PACKCellMinTemper		Pack6	0.1°C	S16		04H
3683	PACKMosfetAveTempe		Pack6	0.1°C	S16		04H
3684	PACKMosfetMaxTempe		Pack6	0.1°C	S16		04H
3685	PACKMosfetMinTempe		Pack6	0.1°C	S16		04H
3686	PACKEnvirAveTemper		Pack6	0.1°C	S16		04H
3687	PACKEnvirMaxTemper		Pack6	0.1°C	S16		04H
3688	PACKEnvirMinTemper		Pack6	0.1°C	S16		04H
3689	Ave cell voltage		Pack6	0.01V	U16		04H
3690	Maximum cell voltage		Pack6	0.01V	U16		04H
3691	Minimum cell voltage		Pack6	0.01V	U16		04H

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3692	BMSVersion order0-1		Pack6	ASCII	U16		04H
3693	BMSVersion order2-3		Pack6	ASCII	U16		04H
3694	BMSVersion order4-5		Pack6	ASCII	U16		04H
3695~3704	Reserve						
3705	PACKAdd		Pack7		U16		04H
3706	PACKWarFlag		Pack7		U16	description-1	04H
3707	PACKProtectFlag		Pack7		U16	description-2	04H
3708	PACKStatusFaultFlag		Pack7		U16	description-3	04H
3709	PackBatVolt		Pack7	0.01V	U16		04H
3710	PACKCur		Pack7	0.01A	S16		04H
3711	PACKBalanceStatus		Pack7		U16		04H
3712	PACKBatCycCnt		Pack7		U16		04H
3713	PACKSOH		Pack7	%	U16	0~100	04H
3714	PACKSOC		Pack7	%	U16	0~100	04H
3715	AccUseTimeOverTemper		Pack7		U16		04H
3716	PackOnline		Pack7		U16	0:Off line 1:Online	04H
3717	Reserve		Pack7		U16		04H
3718	PACKDesignCapactiy		Pack7	mAh*100	U16		04H
3719	PACK ResidualCapacity		Pack7	Ah	U16		04H
3720	PACKTotalCapacity		Pack7	mAh*100	U16		04H
3721	PACKDischargPowSum		Pack7	KWH	U16		04H
3722	PACKChargPowSum		Pack7	KWH	U16		04H
3723	PACKHeatingRequest		Pack7		U16	1: Request heating 0:Heating not requested	04H
3724	PACKCellAveTemper		Pack7	0.1°C	S16		04H
3725	PACKCellMaxTemper		Pack7	0.1°C	S16		04H
3726	PACKCellMinTemper		Pack7	0.1°C	S16		04H
3727	PACKMosfetAveTempe		Pack7	0.1°C	S16		04H
3728	PACKMosfetMaxTempe		Pack7	0.1°C	S16		04H
3729	PACKMosfetMinTempe		Pack7	0.1°C	S16		04H
3730	PACKEnvirAveTemper		Pack7	0.1°C	S16		04H
3731	PACKEnvirMaxTemper		Pack7	0.1°C	S16		04H
3732	PACKEnvirMinTemper		Pack7	0.1°C	S16		04H
3733	Ave cell voltage		Pack7	0.01V	U16		04H
3734	Maximum cell voltage		Pack7	0.01V	U16		04H

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3735	Minimum cell voltage		Pack7	0.01V	U16		04H
3736	BMSVersion order0-1		Pack7	ASCII	U16		04H
3737	BMSVersion order2-3		Pack7	ASCII	U16		04H
3738	BMSVersion order4-5		Pack7	ASCII	U16		04H
3739~3748	Reserve						
3749	PACKAdd		Pack8		U16		04H
3750	PACKWarFlag		Pack8		U16	description-1	04H
3751	PACKProtectFlag		Pack8		U16	description-2	04H
3752	PACKStatusFaultFlag		Pack8		U16	description-3	04H
3753	PackBatVolt		Pack8	0.01V	U16		04H
3754	PACKCur		Pack8	0.01A	S16		04H
3755	PACKBalanceStatus		Pack8		U16		04H
3756	PACKBatCycCnt		Pack8		U16		04H
3757	PACKSOH		Pack8	%	U16	0~100	04H
3758	PACKSOC		Pack8	%	U16	0~100	04H
3759	AccUseTimeOverTemper		Pack8		U16		04H
3760	PackOnline		Pack8		U16	0:Off line 1:Online	04H
3761	Reserve		Pack8		U16		04H
3762	PACKDesignCapactiy		Pack8	mAh*100	U16		04H
3763	PACK ResidualCapacity		Pack8	Ah	U16		04H
3764	PACKTotalCapacity		Pack8	mAh*100	U16		04H
3765	PACKDischargPowSum		Pack8	KWH	U16		04H
3766	PACKChargPowSum		Pack8	KWH	U16		04H
3767	PACKHeatingRequest		Pack8		U16	1: Request heating 0:Heating not requested	04H
3768	PACKCellAveTemper		Pack8	0.1°C	S16		04H
3769	PACKCellMaxTemper		Pack8	0.1°C	S16		04H
3770	PACKCellMinTemper		Pack8	0.1°C	S16		04H
3771	PACKMosfetAveTempe		Pack8	0.1°C	S16		04H
3772	PACKMosfetMaxTempe		Pack8	0.1°C	S16		04H
3773	PACKMosfetMinTempe		Pack8	0.1°C	S16		04H
3774	PACKEnvirAveTemper		Pack8	0.1°C	S16		04H
3775	PACKEnvirMaxTemper		Pack8	0.1°C	S16		04H
3776	PACKEnvirMinTemper		Pack8	0.1°C	S16		04H
3777	Ave cell voltage		Pack8	0.01V	U16		04H

3778	Maximum cell voltage		Pack8	0.01V	U16		04H
3779	Minimum cell voltage		Pack8	0.01V	U16		04H
3780	BMSVersion order0-1		Pack8	ASCII	U16		04H
3781	BMSVersion order2-3		Pack8	ASCII	U16		04H
3782	BMSVersion order4-5		Pack8	ASCII	U16		04H
3783~3792	Reserve						

Table 3.1.2

S/N	Content	Code	Chinese description	English description
0	Bit0	W00	电网电压低	Grid Volt Low
1	Bit1	W01	电网电压高	Grid Volt High
2	Bit2	W02	电网频率低	Grid Frequency Low
3	Bit3	W03	电网频率高	Grid Frequency High
4	Bit4	W04	PV 未接	Solar Loss
5	Bit5	W05	电池未连接	Bat Loss
6	Bit6	W06	电池欠压	Bat Under Volt
7	Bit7	W07	电池电压低	Bat Volt Low
8	Bit8	W08	电池电压高	Bat Volt High
9	Bit9	W09	过载报警	Over Load
10	Bit10	W10	漏电流高	GFCI Over
11	Bit11	W11	LN 反接	LN Fault
12	Bit12	W12	风扇故障	Fan Fault
13	Bit13	W13	电池容量低关机	Bat CapUnder
14	Bit14	W14	BMS 放电过流	Bms DisChg Over
15	Bit15	W15	BMS 充电过流	Bms Chg Over
16	Bit16	W16	BMS 总压高	Bms Volt Over
17	Bit17	W17	BMS 过温	Bms Temp Over
18	Bit18	W18	BMS 放电低温	Bms Dis Temp Low
19	Bit19	W19	BMS 单体不平衡	Bms Volt Imbalance
20	Bit20	W20	BMS 通讯异常	Bms Communicate Fault
21	Bit21	W21	BMS 电池欠压	Bms Volt Under
22	Bit22	W22	BMS 充电低温保护	Bms Chg Temp Low
23	Bit23	W23	BMS 电池轻微过压	Bms_VoltHigh
24	Bit24	W24	BMS 电池轻微过温	Bms_TempHigh
25	Bit25	W25	BMS 内部程序升级中	Bms_Updating
26	Bit26	W26	BMS 程序版本号不一致	Bms_VersionErr

27	Bit27	W27	BMS 程序升级失败	Bms_UpdateFail
28	Bit28	W28	CT 接反	CT Converse
29	Bit29	W29	时钟告警	Clock Fail

Table 3.1.3

S/N	Content	Code	Chinese description	English description
0	Bit0	F00	软启超时	Soft Time Out
1	Bit1	F01	逆变器输出短路	INV Volt Short
2	Bit2	F02	GFCI 传感器异常	GFCI Sensor Fault
3	Bit3	F03		
4	Bit4	F04	母线电压低	Bus Low Fault
5	Bit5	F05	母线电压高	Bus High Fault
6	Bit6	F06	母线短路	Bus Short Fault
7	Bit7	F07	PV 绝缘阻抗低	PV ISO Under Fault
8	Bit8	F08	PV 输入短路	PV Input Short
9	Bit9	F09	旁路继电器故障	Op Relay Fault
10	Bit10	F10	逆变过流	INV Curr Over
11	Bit11	F11	直流分量高	INV DC Over
12	Bit12	F12	箱体内环境过温	Ambient Over Temp
13	Bit13	F13	散热器过温	Sink Over Temp
14	Bit14	F14	并网继电器异常	Grid Relay Fault
15	Bit15	F15	电池放电过流	DisChg Curr Over
16	Bit16	F16	电池充电过流	Chg Curr Over
17	Bit17	F17	电流传感器错误	Current Sensor Fault
18	Bit18	F18	逆变输出异常	INV Abnormal
19	Bit19	F19	后备继电器错误	EPS Relay Fault
20	Bit20	F20	总是过载	Always over load
31	Bit31	F31	主从通讯错误	SCI Fault

Table 3.1.4

S/N	Content	Chinese description description
0	00H	initialize
1	01H	standby
2	02H	Hybrid grid
3	03H	off-network
4	04H	Mains charging

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5	05H	PV charging
6	06H	Mains bypass
7	07H	fault
8	08H	Debug
9	09H	forced charge
10	0AH	Power on the device separately from the
11	0BH	DSP burn
12	0CH	MCU burn
13	0DH	permanent error

Note: When the inverter is in system initialization, the communication data is invalid.。

Table 3.1.5

S/N	Content	Inverter Model	Rated Power	Type
0	00H	KSE-2K-048S	2k	Single Phase Model
1	01H	KSE-3K-048S	3k	
2	02H	KSE-3.6K-048S	3.6k	
3	03H	KSE-4.6K-048S	4.6k	
4	04H	KSE-5K-048S	5k	
5	05H	KSE-3.6K-048	3.6k	
6	06H	KSE-4.6K-048	4.6k	
7	07H	KSE-5K-048	5k	
8	08H	KSE-6K-048	6k	
9	09H	BluE-S 3680D	3.68k	
10	0AH	reserve		
11	0BH	BluE-S 5000D	5k	
12	0CH	BluE-S 6000D	6k	
13	0DH	reserve		
14	0EH	KSE-3K-048S M1	3k	
15	0FH	BluE-S 3680D M1	3.68k	
16	10H	reserve		
17	11H	BluE-S 5000D M1	5k	
18	12H	BluE-S 6000D M1	6k	
19~31	13H~1FH	reserve		
32	20H	E10KT	10k	Three phase model
33	21H	E8KT	8k	
34	22H	E12KT	12k	
35~47	23H~2FH	reserve		

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Table 3.1.7

S/N	Content	Code	Chinese description	English description description
0	0 位	F32	Communication	Error in communication with the DSP

Table 3.1.8

S/N	Content	Input Model
0	00H	Independent input mode
1	01H	Parallel input mode
2	02H	Constant voltage input mode

Table 3.1.9

S/N	Content	On-Grid standards
0	00H	China
1	01H	Germany
2	02H	Australia
3	03H	Italy
4	04H	Spanish
5	05H	UK
6	06H	Hungary
7	07H	Belgium
8	08H	West Australia
9	09H	Greece
10	0AH	France
11	0BH	Bankok
12	0CH	Tailand
13	0DH	South Africa
14	0EH	EN50549
15	0FH	Brazil
16	10H	VDE0126
17	11H	Ireland
18	12H	Israel
19	13H	Poland
20	14H	Chile
21	15H	Local

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22	16H	60Hz
23	17H	Danmark
23-255	17H-FFH	Reserved

Table 3.1.9.1

GridSubdivide	0	1	2
Italy	CEIO-21	CEIO-21 ACEA	
Australia	AUS_A	AUS_B	AUS_C
Chile	CHILE_BT	CHILE_HD	CHILE_LD

Table 3.1.10

S/N	Content	Remark
0	00H	Standby
1	01H	Off-grid
2	02H	On-grid
3	03H	Off-grid to On-grid
4	04H	On-grid to Off-grid

Table 3.1.11

S/N	Content	Remark
0	00H	Standby
1	01H	Soft boot
2	02H	Charging mode
3	03H	Discharging mode

Table 3.1.12

Working Mode	Remark
Self Consumption/Battery Priority	Invalid
PEAK SFT	0 Untimed Charge/Discharge
	1 Timing Discharge
	2 Timing Charge

Table 3.1.13

S/N	Content	Remark
0	00H	Normal
1	01H	GFCI high
2	02H	Grid Voltage loss
3	03H	Grid Frequency loss

	Warning Flag
BIT0	The battery core overvoltage alarm is generated
BIT1	Battery core overvoltage Alarm Battery core low voltage alarm If the fault is reported during discharge and the fault is not reported during charging, it can be interpreted as being cleared
BIT2	The battery pack overvoltage alarm is generated
BIT3	The battery pack low voltage alarm is generated
BIT4	Charging overcurrent alarm is generated
BIT5	The discharge overcurrent alarm is generated
BIT6	reserved
BIT7	reserved
BIT8	Charging high temperature alarm (core temperature)
BIT9	Discharge high temperature alarm (core temperature)
BIT10	Charging low temperature alarm (core temperature)
BIT11	Discharge low temperature alarm (core temperature)
BIT12	The ambient temperature is too high
BIT13	The ambient temperature is too low
BIT14	MOSFET High temperature alarm
BIT15	SOC low alarm

description-2

	Protecting Flag
BIT0	Battery cell overvoltage

	protection
BIT1	Battery cell low voltage protection
BIT2	Battery pack overvoltage protection
BIT3	Battery pack low voltage protection
BIT4	Charging overcurrent protection
BIT5	Discharge overcurrent protection
BIT6	Short circuit current protection
BIT7	Charging overvoltage protection
BIT8	Charging high temperature protection (cell temperature)
BIT9	Discharge high temperature protection (cell temperature)
BIT10	Charge low temperature protection (cell temperature)
BIT11	Discharge low temperature protection (cell temperature)
BIT12	MOSFET high temperature protection
BIT13	High ambient temperature protection
BIT14	Low ambient temperature protection
BIT15	reserved

description-3

	Status/Fault Flag
BIT0	The charging MOSFET is faulty
BIT1	The discharge MOSFET is faulty
BIT2	Temperature sensor failure
BIT3	Cell sampling failure
BIT4	The battery core is faulty
BIT5	The front-end sampling communication

	is faulty
BIT6	Heated Mos fault
BIT7	The inverter shuts down the battery pack
BIT8	charging state
BIT9	Dischabung state
BIT10	1: Charging MOSFET is on 0: The charging MOSFET is off
BIT11	1: The discharge MOSFET is on 0: The discharge MOSFET is off
BIT12	1: Discharge limit is enabled 0: The discharge limit is off
BIT13	Circuit breaker on/off state (0 off and 1 in)
BIT14	Charging the reverse
BIT15	1: The heater is turned on 0: The heater is off

3.1. Inverter system information (03H)

Table 3.2.1

Register Address	Item	Byte	Byte No.	Data Type	Remark	FUNC
3200-3207	Inverter Model (char)	16		U8	ASCII char	03H
3208-3215	Battery name (char)	16		U8	ASCII char	03H
3216	ARM version number	1		U8	10 refers to V1.0	03H
	ARM testing version number	1		U8	Note 1	03H
3217	DSP version number	1		U8	10 refers to V1.0	03H
	DSP testing version number	1		U8	Note 1	03H
3218	DSP2 version number	1		U8	Only for Three Phase Model (refer to 3.1.5)	03H
	DSP2 testing version number	1		U8		03H
3219-3237	Reserved					03H

Note 1: the test version number range is 0-99. If the DSP1 version number is v1.0, the DSP1 test version number is 2, and the DSP1 full version number is v1.0.2

3.2. Inverter setting (10H)

Table 3.3.1

Register Address	Item	Byte	Byte No.	Data Type	Remark	FUNC
3160-3167	Charge_START_TIME-1, set(time)	4		ASCII	Table 3.3.3	10H
	Charge_END_TIME-1, set(time)	4		ASCII	Table 3.3.3	10H
	Discharge_START_TIME-1, set(time)	4		ASCII	Table 3.3.3	10H
	Discharge_END_TIME-1, set(time)	4		ASCII	Table 3.3.3	10H
3168~3175	Charge_START_TIME-2, set(time)	4		ASCII		10H
	Charge_END_TIME-2, set(time)	4		ASCII		10H
	Discharge_START_TIME-2, set(time)	4		ASCII		10H
	Discharge_END_TIME-2, set(time)	4		ASCII		10H
3176-3199	Reserved					10H
3200-3207	Inverter Model (char)	16		U8	ASCII char	10H
3208-3215	Battery Name (char)	16		U8	ASCII char	10H
3216-3227	Reserved					10H
3228-3238	Inverter SN	22		U8	ASCII char	10H
3239-3245	Clock Information	14		U8	Table 3.3.2	10H
3246	Reserved					10H

Note: The setting information should be written into the corresponding address at one time. For example, the clock setting information should be written into the address of register 3239-3245 at the same time, and the PEAK SFT setting information should be written into the address of register 3160-3167 at the same time

Table 3.3.2

Register	Item	Byte	Byte	Data	Remark
----------	------	------	------	------	--------

3239	Year(tens)	1	0	U8	ASCII char	
	Year(unit)	1	1	U8	ASCII char	
3240	Month(tens)	1	2	U8	ASCII char	
	Month (unit)	1	3	U8	ASCII char	
3241	Day(tens)	1	4	U8	ASCII char	
	Day (unit)	1	5	U8	ASCII char	
3242	Hour(tens)	1	6	U8	ASCII char	
	Hour (unit)	1	7	U8	ASCII char	
3243	Minute(tens)	1	8	U8	ASCII char	
	Minute (unit)	1	9	U8	ASCII char	
3244	Second(tens)	1	10	U8	ASCII char	
	Second (unit)	1	11	U8	ASCII char	
3245	Week	1	12	U8	ASCII char	
		1	13	U8	ASCII char	

Table 3.3.3

Register Address	Item	Byte	Data Type	Remark
High word	Hour(tens)	1	U8	ASCII char
	Hour (unit)	1	U8	ASCII char
Low word	Minute(tens)	1	U8	ASCII char
	Minute (unit)	1	U8	ASCII char

3.3. Execution commands (06H 遥调)

Table 3.4.1

Register Address	Item	Byte	Byte No.	Unit	Data Type	Remark	FUNC
3240	Clear statistics	2	480		U16	DATA arbitrary number	06H
3241	Remote Shutdown	2	482		U16	DATA arbitrary number	06H
3242	Disable Remote Shutdown	2	484		U16	DATA arbitrary number	06H

Table 3.4.2

Value	Power factor set
80-100	Reactive work is negative, leading work is 0.8-1
-(80-100)	Reactive work is positive, lagging work0.8-1

Table 3.4.3

Range of	Description
0-100	Limit maximum power

Table 3.4.4

Range of Value	Description
-60 - +60	Set the reactive power percentage

Table 3.4.5

Value	Description
0	Control by power factor
1	Control by reactive power factor
2	Control by QU curve
3	Control by QP curve

Table 3.4.6

Value	Battery type
0x01	Lead-Acid
0x02	Reserved
0x03	Reserved
0x04	Reserved
0x05	Reserved
0x06	LFP
0x07	Reserved

Table 3.4.7

Description	Only valid when the battery type is lead-acid
Capacity	50~1000; Default is 100

range of	
Lead acid	
battery	

4. Protocol Implementation Example(for reference only)

4.1. Querying basic information

Read input register, starting address 3000, length 1 cell (2 bytes)

Master

Byte S/N	0	1	2	3	4	5	6	7
Content	01	04	0B	B8	00	01	B3	CB
Formate	ID	FUNC	ADDR		LENGTHE: 1 register (2 bytes)		CRC	

Slave

Byte S/N	0	1	2	3	4	6	7
Content	01	04	02	00	65	79	1B
Formate	ID	FUNC	BYTE LEN	DATA	DATA	CRC	

4.2. Querying System Information

Read holding register, starting address 3200, length 1 cell (2 bytes)

Master

Byte S/N	0	1	2	3	4	5	6	7
Content	01	03	0C	80	00	01	86	B2
Formate	ID	FUNC	ADDR		DATA	DATA	CRC	

Slave

Byte S/N	0	1	2	3	4	6	7
Content	01	03	02	4B	53	CE	89
Formate	ID	FUNC	BYTE LEN	DATA	DATA	CRC	

4.3. Setting the Inverter Clock

Set Inverter Clock Message: Tuesday, November 2, 2010 14:30:00

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Master

Byte S/N	0	1	2	3	4	5	6	7
Content	01	10	0C	A7	00	07	0E	31
Formate	ID	FUNC	ADDR		REGISTER		BYTE	DATA
					QUANTITY		COUNT	

Byte S/N	8	9	10	11	12	13	14	15
Content	30	31	31	30	32	31	34	33
Formate	DATA	DATA	DATA	DATA	DATA	DATA	DATA	DATA

Byte S/N	16	17	18	19	20	21	22
Content	30	30	30	32	30	17	2E
Formate	DATA	DATA	DATA	DATA	DATA	CRC	

Slave

Byte S/N	0	1	2	3	4	5	6	7
Content	01	10	0C	A7	00	07	33	78
Formate	ID	FUNC	ADDR		DATA	DATA	CRC	

4.4. Setting the weak_peak time

Charging start time: 11:24

Charging deadline: 11:25

Discharge start time: 11:26

Discharge deadline: 11:27

Master

Byte S/N	0	1	2	3	4	5	6	7
Content	01	10	0C	58	00	08	10	31
Formate	ID	FUNC	ADDR		REGISTER		BYTE	DATA
					QUANTIT		COUN	

Byte S/N	8	9	10	11	12	13	14	15
Content	31	32	34	31	31	32	35	31
Formate	DATA	DATA	DATA	DATA	DATA	DATA	DATA	DATA

Byte S/N	16	17	18	19	20	21	22	23	24
Content	31	32	36	31	31	32	37	09	91

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Formate	DATA	DATA	DATA	DATA	DATA	DATA	DATA	CRC
---------	------	------	------	------	------	------	------	-----

Slave

Byte S/N	0	1	2	3	4	5	6	7
Content	01	10	0C	58	00	08	43	4C
Formate	ID	FUNC	ADDR		DATA	DATA	CRC	

4.5. Executing remote commands

Limit maximum power 85%

Master

Byte S/N	0	1	2	3	4	5	6	7
Content	01	06	0F	B3	00	55	BB	06
Formate	ID	FUNC	ADDR		DATA	DATA	CRC	

Slave

Byte S/N	0	1	2	3	4	5	6	7
Content	01	06	0F	B3	00	55	BB	06
Formate	ID	FUNC	ADDR		DATA	DATA	CRC	