

KH/KA 系列储能逆变器 Modbus 通讯协议



文件修正记录

序号	版本	修正人	修正内容概要	修正日期
1	V1.00.00	ZhouSongping	1、初版订制。	2023.05.22
2	V1.01.00	ZhouSongping	1、变更功率数据寄存器数据范围。	2023.07.08
拟制	审核	标准化	批准	

1. 通讯参数

1.1. 通讯基本参数

Communication Parameter	Setting Value
Band Rate	9600bps
Data Length	8bits
Parity	none
Stop bits	1bit

1.2. 协议格式

功能码说明

Function Code	Meaning	Remarks
0x03	Read registers	Continuously reads a single register or multiple registers.
0x06	Write a single register	Writes into a single register.
0x10	Write multiple registers	Continuously writes into multiple registers.

1.2.1. 03 (0x03) Read Holding Registers

Request

从机地址	1 Byte	Modbus Address	Slave Address, 默认是 0xF7
功能码	1 Byte	0x03: 读保持寄存器	Function code
寄存器起始地址	1 Byte	Starting Address Hi	Starting Address 0x0000 to 0xFFFF
	1 Byte	Starting Address Lo	
寄存器数量	1 Byte	No. of Registers Hi	Quantity of Registers N* = 1 to 125 (0x7D)
	1 Byte	No. of Registers Lo	
CRC 校验	1 Byte	低位	
	1 Byte	高位	

Response

从机地址	1 Byte	Modbus Address	Slave Address, 默认是 0xF7
功能码	1 Byte	0x03: 读保持寄存器	Function code
字节数	1 Byte	寄存器数量 * 2	Byte count 2 x N*
寄存器值	1 Byte	高位	N* x 2 Bytes
	1 Byte	低位	
	
	
CRC 校验	1 Byte	低位	

	1 Byte	高位	
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Error

从机地址	1 Byte	Modbus Address	Slave Address, 默认是 0xF7
故障码	1 Byte	0x83	Error code
异常码	1 Byte	01 or 02 or 03 or 04	Exception code
CRC 校验	1 Byte	低位	
	1 Byte	高位	

1.2.2. 06 (0x06) Write Single Register

Request

从机地址	1 Byte	Modbus Address	Slave Address, 默认是 0xF7
功能码	1 Byte	0x06: 写单个寄存器	Function code
寄存器地址	1 Byte	Register Address Hi	Register Address
	1 Byte	Register Address Lo	0x0000 to 0xFFFF
寄存器值	1 Byte	Register Value Hi	Register Value
	1 Byte	Register Value Lo	0x0000 to 0xFFFF
CRC 校验	1 Byte	低位	
	1 Byte	高位	

Response

从机地址	1 Byte	Modbus Address	Slave Address, 默认是 0xF7
功能码	1 Byte	0x06: 写单个寄存器	Function code
寄存器地址	1 Byte	Register Address Hi	Register Address
	1 Byte	Register Address Lo	0x0000 to 0xFFFF
寄存器值	1 Byte	Register Value Hi	Register Value
	1 Byte	Register Value Lo	0x0000 to 0xFFFF
CRC 校验	1 Byte	低位	
	1 Byte	高位	

Error

从机地址	1 Byte	Modbus Address	Slave Address, 默认是 0xF7
故障码	1 Byte	0x86	Error code
异常码	1 Byte	01 or 02 or 03 or 04	Exception code
CRC 校验	1 Byte	低位	
	1 Byte	高位	

1.2.3. 10 (0x10) Write Multiple Registers

Request

从机地址	1 Byte	Modbus Address	Slave Address, 默认是 0xF7
功能码	1 Byte	0x10: 写多个寄存器	Function code
寄存器地址	1 Byte	Starting Address Hi	Starting Address 0x0000 to 0xFFFF
	1 Byte	Starting Address Lo	
寄存器数量	1 Byte	Quantity of Registers Hi	Quantity of Registers N* = 0x0001 to 0x007B
	1 Byte	Quantity of Registers Lo	
数据长度	1 Byte	Byte Count	Byte Count 2 x N*
数据	1 Byte	Registers Value Hi	Registers Value N* x 2 Bytes
	1 Byte	Registers Value Lo	
	
	
CRC 校验	1 Byte	低位	
	1 Byte	高位	

Response

从机地址	1Byte	Modbus Address	Slave Address, 默认是 0xF7
功能码	1Byte	0x10: 写多个寄存器	Function code
寄存器地址	1Byte	Starting Address Hi	Starting Address 0x0000 to 0xFFFF
	1Byte	Starting Address Lo	
寄存器数量	1Byte	Quantity of Registers Hi	Quantity of Registers 1 to 123 (0x7B)
	1Byte	Quantity of Registers Lo	
CRC 校验	1Byte	低位	
	1Byte	高位	

Error

从机地址	1 Byte	Modbus Address	Slave Address, 默认是 0xF7
故障码	1 Byte	0x90	Error code
异常码	1 Byte	01 or 02 or 03 or 04	Exception code
CRC 校验	1 Byte	低位	
	1 Byte	高位	

2. 数据定义

2.1. 数据类型

Name	Description
U16	Unsigned integer (16 bits)
U32	Unsigned integer (32 bits)
I16	Signed integer (16 bits)
I32	Signed integer (32 bits)
STR	Character string
Bitfield16	16-bit data expressed by bit
Bitfield32	32-bit data expressed by bit
N/A	Not applicable
RO	Data that is readable only
RW	Data that is readable and writable
WO	Data that is writable only

2.2. 寄存器数据

Signal Name	RW	Type	Unit	Gain	Address	Quantity	Scope
Model	RO	STR	N/A	1	30000	16	
Firmware Master	RO	U16	N/A	1	30016	1	
Firmware Slave	RO	U16	N/A	1	30017	1	
Firmware Manager	RO	U16	N/A	1	30018	1	
Firmware Battery Master	RO	U16	N/A	1	30019	1	
Firmware Battery Slave1	RO	U16	N/A	1	30020	1	
Firmware Battery Slave2	RO	U16	N/A	1	30021	1	
Firmware Battery Slave3	RO	U16	N/A	1	30022	1	
Firmware Battery Slave4	RO	U16	N/A	1	30023	1	
Firmware Battery Slave5	RO	U16	N/A	1	30024	1	
Firmware Battery Slave6	RO	U16	N/A	1	30025	1	
Firmware Battery Slave7	RO	U16	N/A	1	30026	1	
Firmware Battery Slave8	RO	U16	N/A	1	30027	1	
BmsMasterSN	RO	STR	N/A	1	30028	15	
BmsSlave1SN	RO	STR	N/A	1	30043	15	
BmsSlave2SN	RO	STR	N/A	1	30058	15	
BmsSlave3SN	RO	STR	N/A	1	30073	15	
BmsSlave4SN	RO	STR	N/A	1	30088	15	
BmsSlave5SN	RO	STR	N/A	1	30103	15	
BmsSlave6SN	RO	STR	N/A	1	30118	15	
BmsSlave7SN	RO	STR	N/A	1	30133	15	
BmsSlave8SN	RO	STR	N/A	1	30148	15	

TBD							
PV1 voltage	RO	I16	V	10	31000	1	
PV1 current	RO	I16	A	10	31001	1	
PV1 power	RO	I16	W	1	31002	1	
PV2 voltage	RO	I16	V	10	31003	1	
PV2 current	RO	I16	A	10	31004	1	
PV2 power	RO	I16	W	1	31005	1	
Grid voltage	RO	U16	V	10	31006	1	
Inv current	RO	I16	A	10	31007	1	
TBD							
Grid Frequency	RO	U16	Hz	100	31009	1	
Eps voltage	RO	U16	V	10	31010	1	
Eps current	RO	I16	A	10	31011	1	
TBD							
Eps Frequency	RO	U16	Hz	100	31013	1	
TBD							
TBD							
TBD							
Rev	RO	N/A	N/A	N/A	31017	1	
Inverter temperature	RO	I16	°C	10	31018	1	
Internal temperature	RO	I16	°C	10	31019	1	
Battery voltage	RO	I16	V	10	31020	1	
Battery current	RO	I16	A	10	31021	1	
Battery power	RO	I16	W	1	31022	1	
Battery temperature	RO	I16	°C	10	31023	1	
SoC	RO	U16	%	1	31024	1	
Maximum charge current	RO	U16	A	10	31025	1	
Maximum discharge current	RO	U16	A	10	31026	1	
Inverter state	RO	U16	N/A	1	31027	1	0: Self-Test 1: WaitState 2: CheckState 3: Normal 4: EpsState 5: FaultState 6: Permanent FaultState 8: FlashState
BMS connect state	RO	U16	N/A	1	31028	1	
Meter1 connect state	RO	U16	N/A	1	31029	1	
Meter2 connect state	RO	U16	N/A	1	31030	1	
Fault 1	RO	Bitfiel	N/A	1	31031	1	参考附录 1

		d16					
Fault 2	RO	Bitfiel d16	N/A	1	31032	1	参考附录 1
Fault 3	RO	Bitfiel d16	N/A	1	31033	1	参考附录 1
Fault 4	RO	Bitfiel d16	N/A	1	31034	1	参考附录 1
Fault 5	RO	Bitfiel d16	N/A	1	31035	1	参考附录 1
Fault 6	RO	Bitfiel d16	N/A	1	31036	1	参考附录 1
Fault 7	RO	Bitfiel d16	N/A	1	31037	1	参考附录 1
Fault 8	RO	Bitfiel d16	N/A	1	31038	1	参考附录 1
PV3 voltage	RO	I16	V	10	31039	1	
PV3 current	RO	I16	A	10	31040	1	
PV3 power	RO	I16	W	1	31041	1	
PV4 voltage	RO	I16	V	10	31042	1	
PV4 current	RO	I16	A	10	31043	1	
PV4 power	RO	I16	W	1	31044	1	
Inv power	RO	I32	W	1	31045	2	
Eps power	RO	I32	W	1	31047	2	
Meter1/CT1 power	RO	I32	W	1	31049	2	
Meter2/CT2 power	RO	I32	W	1	31051	2	
Load power	RO	I32	W	1	31053	2	
TBD							
Total PV energy	RO	U32	KWh	10	32000	2	
Today PV energy	RO	U16	KWh	10	32002	1	
Total charge energy	RO	U32	KWh	10	32003	2	
Today charge energy	RO	U16	KWh	10	32005	1	
Total discharge energy	RO	U32	KWh	10	32006	2	
Today discharge energy	RO	U16	KWh	10	32008	1	
Total feed-in energy	RO	U32	KWh	10	32009	2	
Today feed-in energy	RO	U16	KWh	10	32011	1	
Total Consumption energy	RO	U32	KWh	10	32012	2	
Today Consumption energy	RO	U16	KWh	10	32014	1	
Total output energy	RO	U32	KWh	10	32015	2	
Today output energy	RO	U16	KWh	10	32017	1	
Total input energy	RO	U32	KWh	10	32018	2	
Today input energy	RO	U16	KWh	10	32020	1	
Total load energy	RO	U32	KWh	10	32021	2	

Today load energy	RO	U16	KWh	10	32023	1	
TBD							
RTC-year	RW	U16	N/A	1	40000	1	2000-2099
RTC-month	RW	U16	N/A	1	40001	1	1-12
RTC-day	RW	U16	N/A	1	40002	1	1-31
RTC-hour	RW	U16	N/A	1	40003	1	0-23
RTC-minute	RW	U16	N/A	1	40004	1	0-59
RTC-second	RW	U16	N/A	1	40005	1	0-59
TBD							
Work mode	RW	U16	N/A	1	41000	1	
TBD							
Maximum set charge current	RW	U16	A	10	41007	1	
Maximum set discharge current	RW	U16	A	10	41008	1	
Minimum SoC	RW	U16	%	1	41009	1	Range: 10-100
Maximum SoC	RW	U16	%	1	41010	1	Range: 10-100
Minimum SoC-On Grid	RW	U16	%	1	41011	1	Range: 10-100
TBD							
Sys on/off	RW	U16	N/A	1	41013	1	
Eps frequency select	RW	U16	N/A		41014	1	
Eps output	RW	U16	N/A		41015	1	
Power limit	RW	U16	%	1	41016	1	Range: 0-100
Rev	RW	U16	N/A	1	41017	1	
Ground Protection	RW	U16	N/A	1	41018	1	0: On 1: Off
TBD							
Export Limited Power	RW	I32	W	1	41023	2	Range: 0-30000
TBD							
TBD							
Remote power control Enable	RW	U16	N/A	1	44000	1	
Remote power control timeout	RW	U16	s	1	44001	1	
Remote control-Active power command	RW	I16	W	1	44002	1	
Remote control-Reactive power command	RW	I16	Var	1	44003	1	
TBD							
Clear events	WO	U16	N/A	1	45000	1	清事件
Clear energy	WO	U16	N/A	1	45001	1	清电量
Factory reset	WO	U16	N/A	1	45002	1	恢复出厂

Battery power active	WO	U16	N/A	1	45003	1	BMS 远程激活
Clear Arc Fault	WO	U16	N/A	1	45004	1	清除 Arc 故障
TBD							

3. 附录

3.1. 附录 1: 故障列表

Fault 1

位	错误信息	中文描述	备注
0	GridLostFault	无电网	
1	GridVoltFault	电网电压故障	
2	GridFreqFault	电网频率故障	
3	Grid10minVoltFault	电网电压十分钟过压故障	
4	EpsVoltFault	离网电压故障	
5	SwInvCurFault	逆变侧软件过流故障	
6	DciFault	直流分量故障	
7	TBD		
8	EpsVolFault	离网电压过压故障	
9	SwBusVoltFault	Bus 电压故障	
10	BatOvpFault	电池过压故障	
11	TBD		
12	IsoFault	绝缘阻抗故障	
13	ResCurFault	漏电流过流故障	
14	PvVoltFault	PV 过压	
15	DirectArcFault	拉弧故障	

Fault 2

位	错误信息	中文描述	备注
0	TempFault	过温故障	
1	GroundConnFault	接地错误	
2	TBD		
3	TBD		
4	BatPowerLowFault	离网模式下电池电量低	
5	TBD		
6	TBD		
7	EpsOverLoad	离网模式下过载	
8	SciFault	Master 与 Manager 通讯故障	
9	SpiCommFault	Master 与 Slave 通讯故障	
10	BmsLostFault	Master 与 Bms 通讯故障	

11	TBD		
12	ItalySelftest	意大利自检故障	
13	TBD		
14	CanNodeNum	CAN 节点错误	
15	TBD		

Fault 3

位	错误信息	中文描述	备注
0	TBD		
1	TBD		
2	TBD		
3	TBD		
4	TBD		
5	TBD		
6	TBD		
7	TBD		
8	TBD		
9	TBD		
10	BypassOcp	Bypass 过流故障	
11	TBD		
12	TBD		
13	TBD		
14	TBD		
15	TBD		

Fault 4

位	错误信息	中文描述	备注
0	SampleCircuitOffset	采样零偏故障	
1	RCDevice	漏电流检测设备故障	
2	EEpromFault	EEPROM 读写错误	
3	PvNegCurt	PV 反向电流	
4	BatRly_KeepOpen	电池继电器错误-常开	
5	BatRly_KeepClose	电池继电器错误-常闭	
6	BatBuck	电池侧 BUCK 管故障	
7	BatBoost	电池侧 BOOST 管故障	
8	TBD		
9	ShortEpsLoad	Eps 负载短路故障	
10	BatConnDirFault	电池反接故障	
11	MainRelayOpenFault	主继电器开路故障	
12	MainRelayS1KeepClosed	S1 继电器短路故障	
13	MainRelayS2KeepClosed	S2 继电器短路故障	

14	MainRelayM1KeepClosed	M1 继电器短路故障	
15	MainRelayM2KeepClosed	M2 继电器短路故障	

Fault 5

位	错误信息	中文描述	备注
0	GridVoltConsFault	电网电压采样不一致	
1	GridFreqConsFault	电网频率采样不一致	
2	InvCurtConsistency	逆变电流采样不一致	
3	ResCurConsFault	漏电流采样不一致	
4	TBD		
5	TBD		
6	TBD		
7	TBD		
8	SPICommFault	SPI 通讯丢失	
9	SampleCircuitOffset	采样电路零偏故障	
10	TBD		
11	TBD		
12	TBD		
13	TBD		
14	TBD		
15	TBD		

Fault 6

位	错误信息	中文描述	备注
0	ArmEepromFault	Manager EEPROM 故障	
1	MeterLostFault	电表通讯故障	
2	CtLostFault	CT 丢失故障	
3	TBD		
4	TBD		
5	TBD		
6	TBD		
7	TBD		
8	TBD		
9	TBD		
10	TBD		
11	TBD		
12	TBD		
13	TBD		
14	TBD		
15	TBD		

Fault 7

位	错误信息	中文描述	备注
0	BmsExternalFault	BMS 外部错误	
1	BmsInternalFault	BMS 内部错误	
2	BmsVoltHighFault	BMS 电池电压过高	
3	BmsVoltLowFault	BMS 电池电压过低	
4	BmsChgCurHighFault	BMS 电池充电过流	
5	BmsDischgCurHighFault	BMS 电池放电过流	
6	BmsTempHighFault	BMS 电池温度过高	
7	BmsTempLowFault	BMS 电池温度过低	
8	BmsCellImbalance	BMS 电池单体不平衡	
9	BmsHardwareProtect	BMS 硬件保护	
10	BmsCircuitFault	BMS 电路故障	
11	BmsInsulationFault	BMS 绝缘故障	
12	BmsVoltSensorFault	BMS 电压传感器故障	
13	BmsTempSensorFault	BMS 温度传感器故障	
14	BmsCurSensorFault	BMS 电流传感器故障	
15	BmsRelayFault	BMS 继电器故障	

Fault 8

位	错误信息	中文描述	备注
0	BmsTypeUnmatch	BMS 容量不一致	
1	BmsVersionUnmatch	BMS 软件版本不一致	
2	BmsManufacturerUnmatch	BMS 电芯厂商不一致	
3	BmsSwHwUnmatch	BMS 从控软硬件不一致	
4	BmsMSUnmatch	BMS 主从控软件不一致	
5	BmsChgReqNoReply	BMS 充电请求未响应	
6	BmsSupplyFault	BMS 电源故障	
7	TBD		
8	BmsSelfChkFault	BMS 自检故障	
9	BmsCellTempDiffFault	BMS 温差故障	
10	BmsCellVoltBreakLineFault	BMS 断线故障	
11	BmsSelfChkSysVoltMisMatchFault	BMS 模块压差故障	
12	BmsPreChgFault	BMS 预充故障	
13	BmsSelfChkHvbFault	BMS 自检总压故障	
14	BmsSelfChkPackCurFault	BMS 自检电流故障	
15	BmsSelfChkSysMismatchFault	BMS 自检匹配故障	