Technical Information

AISWEI Interface

(Based On Modbus Standard Protocol)

Version	Comments	Author
1.0	First edition	Jincheng Wang
2.1	Upgrade to 2.1 version	Jeff.Ji
2.1.1	Upgrade to 2.1.1 version	Jeff.Ji
2.1.2	Upgrade to 2.1.2 version	Guohao.Li
2.1.3	Upgrade to 2.1.3 version	Shaochen.Mao
2.1.4	Upgrade to 2.1.4 version	Zhengjian.Zhou
2.1.5	31311 Chage the description to 'Internal temperature' 31611 Add the error 3 of battery 31613 Add the bit 9 in warn1 31637~31639 Change the type from U32 to S32 31651 Change the type from U32 to S32 31655 Change the type from U32 to S32 31659 Change the type from U32 to S32 31684~31688 Add the diesel engine data 33059 Add the enable/disable status of communicaiton checking for G100 340001~340529 Add the pack informatioin 340801~342740 Add the pack data 41197~41209 Add the control code for diesel engine 44008 Change the code from 2 to 1 for enable in HVRT 44028 Add the enable/disable of diesel engine 44029 Add the enable/disable of communication checking for G100 44030 Add the enable/disable of power limitation for TN-C 44031 Add the enable/disable of fuse element for G100 41116 Change the description to 'OFFNET Mode Checking' 41240 Add the meter model to DSP 41245~41251 Add the parameter settings for TN-C 45454~45455 Add tge current limitation of AC input/outpu	Zhengjian.zhou

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'Modbus' herein refers to industrial standard serial communication protocol.

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1 Information on this Document

Validity

This document is valid for AISWEI inverters.

Target Group

This document is intended for qualified persons. Only persons with appropriate skills are allowed to perform the tasks described in this document.

Terminology

Information	Explanation
Pn	The rated active power of device
Pm	The instantaneous power when the power control curve reaches the starting point
Sn	The rated apparent power of device

2   Safety

2.1   Intended Use

The Modbus interface of the supported devices is designed for industrial use, via RS485 or RS422 protocol to enable remote control of the PV system, remote querying of values, and remote parameter setting.

2.2   Skills of Qualified Persons

The activities described in this document must only be performed by qualified persons. Qualified persons must have the following skills:

- Detailed knowledge of the grid management services
- Knowledge of IP-based network protocols
- Training in the installation and configuration of IT systems
- Knowledge of the Modbus specifications
- Knowledge of and compliance with this document and all safety information

3   AISWEI Modbus Profile

3.1   Information on the Assignment Tables

The assignment tables of the AISWEI Modbus profile present the following information:

Information	Explanation
ADR (DEC)	Decimal Modbus address, you need to remove 3x or 4x and subtract 1, then convert to hexadecimal and use it in the communication frame. Such as 31001 (decimal) → 1000 (decimal) → 0x03e8 (hexadecimal)
Description/ number code(s)	Short description of the Modbus registers and the number codes used.
Type	Type of the data (see Section 3.2).
Unit	Unit of the data.
Gain	Real value = Gain * output value
Access	RO: Read Only RW: Read and Write WO: Write Only

3.2 AISWEI Data Types and NaN Values

The following table shows the data types used in the AISWEI Modbus profile and the possible NaN values. The AISWEI data types are listed in the assignment tables in the Type column. They describe the data widths of the assigned values:

Type	Description	NaN Value
B16	Bit field (16-bit）	0xFFFF
B32	Bit field (32-bit）	0xFFFF FFFF
S16	Signed integer (16-bit）	0x8000
U16	Unsigned integer (16-bit）	0xFFFF
S32	Signed integer (32-bit）	0x8000 0000
U32	Unsigned integer (32-bit）	0xFFFF FFFF
E16	Number code （16-bit）	0xFFFF
String	String type (16-bit, combination of two 8-bit ASCII characters, the high 8-bit is the first ASCII character, and the low 8-bit is the second ASCII character)	0x0000

3.3 AISWEI Modbus Profile – Register Overview

In the following table you will find all the measured values and parameters of the AISWEI Modbus Profile.

Input Registers

ADDR(DEC)	Description/number code	Type	Unit	Gain	Access
31001	Device Type: 1=Single phase / 3=Three pahse	String	-	-	RO
31002	Modbus address：Default as 3	U16	-	-	RO
31003~31018	Serial Number	String	-	-	RO
31019~31026	Machine type: for example, "ASW3000", please refer to the specific machine in practice	String	-	-	RO
31027	Current grid code: refer to Section 3.5	E16	-	-	RO
31028~31029	Rated Power	U32	W	1.0	RO
31030~31036	Master Software Version	String	-	-	RO
31037~31043	Slave Software Version	String	-	-	RO
31044~31050	Safety Version	String	-	-	RO
31051~31056	Communication protocol version：2.1.5	String	-	-	RO
31057~31064	Manufacturer's name: for example, "AISWEI", refer to the specific machine	String	-	-	RO
31065~31072	Brand name: for example, "AISWEI", please refer to the specific machine	String	-	-	RO
31073	Inverter model： 1-PV Single phase1-3kw 2-PV Single phase3-6kw 3-PV Three phase3-10kW 4-PV Three phase15-23kW 5-PV Three phase50-60kW 11-HY Single phase1-3kW 12-HY Single phase3-6kW	E16	-	-	RO

	13-HY Three phase5-12kW 14-HY Single phase<1kW （Compass） 15-HY Three phase without EPS5-12kW 16-HY Three phase with diesel5-12kW				
31074	MPPT number	U16	-	-	RO
31075	String current number	U16	-	-	RO
31076~31077	Hardware version	String	-	-	RO
31078~31080	Master CPU sub-version	String	-	-	RO
31097~31103	Slaver CPU version	String	-	-	RO
31104~31016	Slaver CPU sub-version	String	-	-	RO
31117	PV1~PV4 string current number	U16	-	-	RO
31118	PV5~PV8 string current number	U16	-	-	RO
31119	PV9~PV12 string current number	U16	-	-	RO
31120	PV13~PV16 string current number	U16	-	-	RO
31121	PV17~PV20 string current number	U16	-	-	RO
31122	PV21~PV24 string current number	U16	-	-	RO
31123	PV25~PV28 string current number	U16	-	-	RO
31124	PV29~PV32 string current number	U16	-	-	RO
31301	Grid rated voltage	U16	V	0.1	RO
31302	Grid rated frequency	U16	Hz	0.01	RO
31303~31304	E-Today of inverter	U32	kWh	0.1	RO
31305~31306	E-Total of inverter	U32	kWh	0.1	RO
31307~31308	H-Total	U32	H	1.0	RO
31309	Device State: 0 = Wait 1 = Normal 2 = Fault 4 = Checking	E16	-	-	RO
31310	Connect time	U16	s	1.0	RO

31311	Internal temperature	S16	℃	0.1	RO
31312	Inverter U phase temperature	S16	℃	0.1	RO
31313	Inverter V phase temperature	S16	℃	0.1	RO
31314	Inverter W phase temperature	S16	℃	0.1	RO
31315	Boost temperature	S16	℃	0.1	RO
31316	Bidirectional DC/DC Converter temperature(*)	S16	℃	0.1	RO
31317	Bus voltage	U16	V	0.1	RO
31319	PV1 voltage	U16	V	0.1	RO
31320	PV1 current	U16	A	0.01	RO
31321	PV2 voltage	U16	V	0.1	RO
31322	PV2 current	U16	A	0.01	RO
31323	PV3 voltage(*)	U16	V	0.1	RO
31324	PV3 current(*)	U16	A	0.01	RO
31325	PV4 voltage(*)	U16	V	0.1	RO
31326	PV4 current(*)	U16	A	0.01	RO
31327	PV5 voltage(*)	U16	V	0.1	RO
31328	PV5 current(*)	U16	A	0.01	RO
31329	PV6 voltage(*)	U16	V	0.1	RO
31330	PV6 current(*)	U16	A	0.01	RO
31331	PV7 voltage(*)	U16	V	0.1	RO
31332	PV7 current(*)	U16	A	0.01	RO
31333	PV8 voltage(*)	U16	V	0.1	RO
31334	PV8 current(*)	U16	A	0.01	RO
31335	PV9 voltage(*)	U16	V	0.1	RO
31336	PV9 current(*)	U16	A	0.01	RO
31337	PV10 voltage(*)	U16	V	0.1	RO
31338	PV10 current(*)	U16	A	0.01	RO
31339	String 1 current(*)	U16	A	0.1	RO
31340	String 2 current(*)	U16	A	0.1	RO
31341	String 3 current(*)	U16	A	0.1	RO
31342	String 4 current(*)	U16	A	0.1	RO
31343	String 5 current(*)	U16	A	0.1	RO

31344	String 6 current(*)	U16	A	0.1	RO
31345	String 7 current(*)	U16	A	0.1	RO
31346	String 8 current(*)	U16	A	0.1	RO
31347	String 9 current(*)	U16	A	0.1	RO
31348	String 10 current(*)	U16	A	0.1	RO
31349	String 11 current(*)	U16	A	0.1	RO
31350	String 12 current(*)	U16	A	0.1	RO
31351	String 13 current(*)	U16	A	0.1	RO
31352	String 14 current(*)	U16	A	0.1	RO
31353	String 15 current(*)	U16	A	0.1	RO
31354	String 16 current(*)	U16	A	0.1	RO
31355	String 17 current(*)	U16	A	0.1	RO
31356	String 18 current(*)	U16	A	0.1	RO
31357	String 19 current(*)	U16	A	0.1	RO
31358	String 20 current(*)	U16	A	0.1	RO
31359	L1 Phase voltage	U16	V	0.1	RO
31360	L1 Phase current	U16	A	0.1	RO
31361	L2 Phase voltage(*)	U16	V	0.1	RO
31362	L2 Phase current(*)	U16	A	0.1	RO
31363	L3 Phase voltage(*)	U16	V	0.1	RO
31364	L3 Phase current(*)	U16	A	0.1	RO
31365	RS Line voltage(*)	U16	V	0.1	RO
31366	RT Line voltage(*)	U16	V	0.1	RO
31367	ST Line voltage(*)	U16	V	0.1	RO
31368	Grid frequency	U16	Hz	0.01	RO
31369~31370	Apparent power	U32	VA	1.0	RO
31371~31372	Active power	S32	W	1.0	RO
31373~31374	Reactive power	S32	Var	1.0	RO
31375	Power factor	S16	-	0.01	RO
31377	Fault state of inverter itself： 0 = No internal fault 1 = Internal fault	E16	-	-	RO
31378	Error message:please refer to section 3.4	E16	-	-	RO

31379	Warning message:please refer to section 3.4	E16	-	-	RO
31389	IOS measure value	U16	-	-	RO
31390	Power limitation master-slave status: 0 = Not available（Power limitation disable） 1 = Master（Power limitation enable） 2 = Slave（Power limitation enable）	U16	-	-	RO
31391	Grid connection status: 0 = disconnection 1 = connection	U16	-	-	RO
31601~31602	PV total power	U32	W	-	RO
31603~31604	PV E-Today	U32	kWh	0.1	RO
31605~31606	PV E-Total	U32	kWh	0.1	RO
31607	Battery communication status: 0x000A=Normal 0x0005=Error	E16	-	-	RO
31608	Battery status: 0 = Not available 1 = Idle 2 = Charging 3 = Discharging 4 = Error	E16	-	-	RO
31609	Battery Error Status 1: bit0 communication data error 0-valid 1-invalid bit1 cell or module voltage is too high 0-valid 1-invalid bit2 Cell or module voltage is too low 0-valid 1-invalid bit3 battery temperature is too high 0-valid 1-invalid bit4 battery temperature is too low 0-valid 1-invalid bit5 discharging current over limit 0-valid 1-invalid bit6 charging current over limit 0-valid 1-invalid	B16	-	-	RO

	bit7 internal communication error 0-valid 1-invalid bit8 Internal cell voltage is unbalance 0-valid 1-invalid bit9 System insulation resistance is too low 0-valid 1-invalid bit10 voltage sensor failure 0-valid 1-invalid bit11 temperature sensor failure 0-valid 1-invalid bit12 contactor failure 0-valid 1-invalid bit13 Self-test failure during starting 0-valid 1-invalid bit14 IC self-test failure 0-valid 1-invalid The default value of undefined bit is 1				
31610	Battery Error Status 2: bit0 Self-test failure for battery voltage 0-valid 1-failure bit1 Self-test failure for system voltage 0-valid 1-invalid bit2 Self-test failure for system insulation resistance 0-valid 1-invalid bit3 RTC invalid 0-valid 1-invalid bit4 EEPROM failure 0-valid 1-invalid bit5 Flash failure 0-valid 1-invalid bit6 AFE invalid 0-valid 1-invalid bit7 Chip failure for insulation resistance dectect 0-valid 1-invalid bit9 Chip failure for current sampling 0-valid 1-invalid bit10 HDC failure 0-valid 1-invalid bit11 Daisy chain failure 0-valid 1-invalid bit12 Failure for precharge 0-valid 1-invalid The default value of undefined bit is 1	B16	-	-	RO

31611	Battery error status3: bit0　The battery is damaged　0-valid 1-invalid bit1　The input overvoltage fails 0-valid 1-invalid bit2　The input is reversed and invalidated　0-valid 1-invalid bit3 　The circuit breaker fails 0-valid 1-invalid The default value of undefined bit is 1	B16	-	-	RO
31613	Battery warning status 1: bit0 Communication data error 0-valid 1-invalid bit1 Battery or module voltage is too high 0-valid 1-invalid bit2 Battery or module voltage is too low 0-valid 1-invalid bit3 Battery temperature is too high 0-valid 1-invalid bit4 Battery temperature is too low 0-valid 1-invalid bit5 discharging current over limit 0-valid 1-invalid bit6 charging current over limit 0-valid 1-invalid bit7 Internal communication failure 0-valid 1-invalid bit8 Internal cell voltage is unbalance　0-valid 1-invalid The default value of undefined bit is 1	B16	-	-	RO
31617	Battery voltage	U16	V	0.01	RO
31618	Battery current	S16	A	0.1	RO
31619~31620	Battery power	S32	w	1	RO
31621	Battery temperature	S16	°C	0.1	RO
31622	Battery SOC	U16	-	0.01	RO
31623	Battery SOH	U16	-	0.01	RO
31624	Battery charging current limit	U16	A	0.1	RO

31625	Battery discharge current limit	U16	A	0.1	RO
31626~31627	Battery E-Charge-Today	U32	kWh	0.1	RO
31628~31629	Battery E-Discharge-Today	U32	kWh	0.1	RO
31630~31631	E-Consumption-Today at AC side	U32	kWh	0.1	RO
31632~31633	E-Generation-Today at AC side	U32	kWh	0.1	RO
31634	EPS load voltage	U16	V	0.1	RO
31635	EPS load current	U16	A	0.1	RO
31636	EPS load frequency	U16	Hz	0.01	RO
31637~31638	EPS load active power	S32	w	1	RO
31639~31640	EPS load reactive power	S32	Var	1	RO
31641~31642	E-Consumption-Today at EPS load side	U32	kWh	0.1	RO
31643~31644	E-Consumption-Total at EPS load side	U32	kWh	0.1	RO
31645	Phase 1 voltage for EPS Load	U16	V	0.1	RO
31646	Phase 1 cuurent for EPS Load	U16	A	0.1	RO
31647	Phase 2 voltage for EPS Load	U16	V	0.1	RO
31648	Phase 2 cuurent for EPS Load	U16	A	0.1	RO
31649	Phase 3 voltage for EPS Load	U16	V	0.1	RO
31650	Phase 3 cuurent for EPS Load	U16	A	0.1	RO
31651~31652	Phase 1 active power for EPS Load	U32	w	1	RO
31653~31654	Phase 1 reactive power for EPS Load	S32	Var	1	RO
31655~31656	Phase 2 active power for EPS Load	U32	w	1	RO
31657~31658	Phase 2 reactive power for EPS Load	S32	Var	1	RO
31659~31660	Phase 3 active power for EPS Load	U32	w	1	RO
31661~31662	Phase 3 reactive power for EPS Load	S32	Var	1	RO
31663~31664	Phase 1 active power for Grid	U32	w	1	RO
31665~31666	Phase 1 reactive power for Grid	S32	Var	1	RO
31667~31668	Phase 2 active power for Grid	U32	w	1	RO
31669~31670	Phase 2 reactive power for Grid	S32	Var	1	RO
31671~31672	Phase 3 active power for Grid	U32	w	1	RO

31673~31674	Phase 3 reactive power for Grid	S32	Var	1	RO
31675~31676	Energy charge today for Grid	U32	kWh	0.1	RO
31677~31678	Energy charge total for Grid	U32	kWh	0.1	RO
31679	Battery insulation resistance	U16	kΩ	1	RO
31680	Battery charge/discharge cycles	U16	-	1	RO
31681	Environment temperature	U16	%	0.1	RO

Holding register

ADDR(DEC)	Description/number code	Type	Unit	Gain	Access
40201	Remote switch command: 0 = POWER OFF 1 = POWER ON 170 = Initialization status	E16	-	-	RW
41001	RTC:Year	U16	-	-	RW
41002	RTC:Month	U16	-	-	RW
41003	RTC:Day	U16	-	-	RW
41004	RTC:Hour	U16	-	-	RW
41005	RTC:Minute	U16	-	-	RW
41006	RTC:Seconds	U16	-	-	RW
41102	Storage Inverter Switch： 1 - OFF 2 - ON	E16	-	-	RW
41103	Type selection of energy storage machine： 0 - Invalid 1 - Energy storage machine 2 - Grid off inveter 3 - Grid connected inverter 4 - Force charge with City electricity (battery wakeup)	E16	-	-	RW
41104	Run mode： 0 - Invalid 1 - Off 2 - Self generating self use 3 - Backup power supply 4 - Customer defined	E16	-	-	RW
41105	Battery manufacturer：	E16	-	-	RW

	1 - PYLON 2 - DYNESS 3 - BYD 4 - LG 5 - AISWEI				
41108	Smart meter status： 0x000A - Meter Online 0x0005 - Meter Offline	E16	-	-	RW
41109	Smart meter adjustment flag bit： 0x000A = Start 0x0005 = Stop	E16	-	-	RW
41110~41111	Set target power value	S32	w	1	RW
41112~41113	Current power value of smart meter	S32	w	1	RW
41114	Anti reverse current flag： 0x000A = ON 0x0005 = OFF	E16	-	-	RW
41115	Battery wake-up (Force charge) sign： 0x000A = ON 0x0005 = OFF 0xFFFF =Not triggered	E16	-	-	RW
41116	UPS function： 0 = Enable EPS function 1 = Enable UPS function	U16	-	-	RW
41151	Commbox and cloud communication status： 0x000A = Cloud Online 0x0005 = Cloud Offline 0x00AF = Network not configured	E16	-	-	RW
41152	Charge discharge flag bit： 1 - Stop 2 - Charging 3 - Discharge	E16	-	-	RW
41153	Charge and discharge power command： ' — '- charging power	S16	W	1	RW

	' + '- discharge power				
41154	Charging SOC upper limit	U16	%	0.01	RW
41155	Discharge SOC lower limit	U16	%	0.01	RW
41156	Obtaining power ratio of power grid	U16	%	0.01	RW
44001	Active power control function： 0 = Disable 1 = Enable	E16	-	-	RW
44002	EEG control function： 0 = Disable 1 = Enable	E16	-	-	RW
44003	Slope load function： 0 = Disable 1 = Enable	E16	-	-	RW
44004	Overvoltage reduce power function： 0 = Disable 1 = Enable	E16	-	-	RW
44005	Overfrequency reduce power function： 0 = Disable 1 = Enable	E16	-	-	RW
44006	Reactive power control fucntion： 0 = Disable 1 = Enable	E16	-	-	RW
44007	LVRT Function： 0 = Disable 1 = Enable	E16	-	-	RW
44008	HVRT Function： 0 = Disable 1 = Enable	E16	-	-	RW
44009	10 Minutes Average Overvoltage protect fucntion 0 = Disable 1 = Enable	E16	-	-	RW
44010	Islanding protect func-tion：	E16	-	-	RW

	0 = Disable 1 = Enable				
44012	PE connnection check function： 0 = Disable 1 = Enable	E16	-	-	RW
44014	AFCI function： 0 = Disable 1 = Enable	E16	-	-	RW
44015	PV string current moni-toring function： 0 = Disable 1 = Enable	E16	-	-	RW
44017	Overload function： 0 = Disable 1 = Enable	E16	-	-	RW
44019	SPD detection function： 0 = Disable 1 = Enable	E16	-	-	RW
44020	Low voltage increase power function： 0 = Disable 1 = Enable	E16	-	-	RW
44021	Low frequency increase power function： 0 = Disable 1 = Enable	E16	-	-	RW
44023	Primary low frequency function(*)： 0 = Disable 1 = Enable	E16	-	-	RW
44024	Communication loss de-tection function(*)： 0 = Disable 1 = Enable	E16	-	-	RW
44025	Shadow MPPT function: 0 = Disable 1 = Enable	E16	-	-	RW
44026	External input signal function：	E16	-	-	RW

	0 = Disable 1 = Enable				
44027	Sunspec write function： 0 = Disable 1 = Enable	E16	-	-	RW
45201	Grid code：please refer to section 3.5	E16	-	-	RW
45202	Overvoltage protection value of the first grid connection	U16	V	0.1	RW
45203	Overvoltage protection value of the first grid connection	U16	V	0.1	RW
45204	Overvoltage protection value of the first grid connection	U16	Hz	0.01	RW
45205	Underfrequency protection value for first grid connection	U16	Hz	0.01	RW
45206	Grid Voltage High Limit3	U16	V	0.1	RW
45207~45208	Grid Voltage High Limit Time3	U32	ms	1.0	RW
45209	Grid Voltage High Limit2	U16	V	0.1	RW
45210~45211	Grid Voltage High Limit Time2	U32	ms	1.0	RW
45212	Grid Voltage High Limit1	U16	V	0.1	RW
45213~45214	Grid Voltage High Limit Time1	U32	ms	1.0	RW
45215	Grid Voltage Low Limit3	U16	V	0.1	RW
45216~45217	Grid Voltage Low Limit Time3	U32	ms	1.0	RW
45218	Grid Voltage Low Limit2	U16	V	0.1	RW
45219~45220	Grid Voltage Low Limit Time2	U32	ms	1.0	RW
45221	Grid Voltage Low Limit1	U16	V	0.1	RW
45222~45223	Grid Voltage Low Limit Time1	U32	ms	1.0	RW

45224	10 Minutes Average Overvoltage Threshold	U16	V	0.1	RW
45225	10 Minutes Average Overvoltage Portect Time	U16	ms	1.0	RW
45226	Overvoltage recover value	U16	V	0.1	RW
45227	Undervoltage recover value	U16	V	0.1	RW
45228	Grid Frequency High Limit3	U16	Hz	0.01	RW
45229~45230	Grid Frequency High Limit Time3	U32	ms	1.0	RW
45231	Grid Frequency High Limit2	U16	Hz	0.01	RW
45232~45233	Grid Frequency High Limit Time2	U32	ms	1.0	RW
45234	Grid Frequency High Limit1	U16	Hz	0.01	RW
45235~45236	Grid Frequency High Limit Time1	U32	ms	1.0	RW
45237	Grid Frequency Low Limit3	U16	Hz	0.01	RW
45238~45239	Grid Frequency Low Limit Time3	U32	ms	1.0	RW
45240	Grid Frequency Low Limit2	U16	Hz	0.01	RW
45241~45242	Grid Frequency Low Limit Time2	U32	ms	1.0	RW
45243	Grid Frequency Low Limit1	U16	Hz	0.01	RW
45244~45245	Grid Frequency Low Limit Time1	U32	ms	1.0	RW
45246	Vary rate of Frequecny protect value	U16	Hz/s	0.01	RW
45247~45248	Vary rate of Frequecny protect time	U32	ms	1.0	RW
45249	Overfrequency recover value	U16	Hz	0.01	RW

45250	Underfrequency recover value	U16	Hz	0.01	RW
45251	Time of first connection to grid	U16	s	1.0	RW
45252	Time of re-connection to grid	U16	s	1.0	RW
45253	ISO protect threshold	U16	kΩ	1.0	RW
45254	DCI protect threshold	U16	mA	1.0	RW
45255	DCI protect time	U16	ms	1.0	RW
45401	Load rate of first connection to grid	U16	%Pn/min	1.0	RW
45402	Load rate of re-connection to grid	U16	%Pn/min	1.0	RW
45403	Active Power Set	U16	%Pn	0.01	RW
45404	Increase rate of active power	U16	%Pn/min	0.01	RW
45405	Decrease rate of active power	U16	%Pn/min	0.01	RW
45408	Over frequency reduce power mode： 0 = None 1 = Fixed reduction ratio, non – hysteresis 2 = Fixed reduction ratio, hysteresis 3 = Not fixed reduction ratio, non – hysteresis 4 = Not fixed reduction ratio, hysteresis 5 = Three points over frequency reduce power, non – hysteresis 6 = Three points over frequency reduce power, hysteresis 7 = Energy storage Italy over frequency reduce power, non – hysteresis	E16	-	-	RW

	8 = Energy storage Italy over frequency reduce power, hysteresis				
45409	Over frequency reduce power: Start frequency	U16	Hz	0.01	RW
45410	Over frequency reduce power: Stop frequecny	U16	Hz	0.01	RW
45411	Over frequency reduce power: Back frequency	U16	Hz	0.01	RW
45412	The reduce ratio of over frequency reduce power	U16	%Pnor%Pm	0.01	RW
45413	Over frequency reduce power :reduce power de-lay time	U16	s	0.1	RW
45414	Over frequency reduce power:recover power de-lay time	U16	s	0.1	RW
45416	Speed of Over frequency recover to Pn	U16	%Pn/min	0.01	RW
45417	Over frequency reduce power(*): 0 power frequency point	U16	Hz	0.01	RW
45419	Over voltage reduce power mode： 0 = None 1 = Not fixed reduction ratio, non – hysteresis 2 = Not fixed reduction ratio, hysteresis 3 = Fixed reduction ratio, non – hysteresis 4 = Fixed reduction ratio, hysteresis 5 = Taiwan's autonomous power regulation 6 = Trina Solar customiza-tion mode	E16	-	-	RW

45420	Over voltage reduce power: Start voltage	U16	%Un	0.01	RW
45422	Over voltage reduce power: Stop voltage	U16	%Un	0.01	RW
45424	Over voltage reduce power: Back voltage	U16	%Un	0.01	RW
45426	The reduce ratio of over voltage reduce power	U16	%Pnor%Pm	0.01	RW
45427	Over voltage reduce power delay time	U16	s	0.1	RW
45428	Over voltage recover power delay time	U16	s	0.1	RW
45429	Speed of Over voltage re-cover to Pn	U16	%Pn/min	0.01	RW
45432	Under frequency in-crease power mode： 0 = None 1 = Fixed reduction ratio, non – hysteresis 2 = Fixed reduction ratio, hysteresis 3 = Not fixed reduction ratio, non – hysteresis 4 = Not fixed reduction ratio, hysteresis 5 = Three points under frequency increase power, non – hysteresis 6 = Three points under frequency increase power, hysteresis 7 = Energy storage Italy under frequency increase power, non – hysteresis 8 = Energy storage Italy under frequency increase power, hysteresis	E16	-	-	RW

45433	Under frequency increase power: Start frequency	U16	Hz	0.01	RW
45434	Under frequency increase power: Stop frequecny	U16	Hz	0.01	RW
45435	Under frequency increase power: Back frequency	U16	Hz	0.01	RW
45436	The increase ratio of under frequency increase power	U16	%Pnor%Pm	0.01	RW
45437	Under frequency increase power delay time	U16	s	0.1	RW
45438	Under frequency recover power delay time	U16	s	0.1	RW
45440	Speed of Under frequency recover to Pn	U16	%Pn/min	0.01	RW
45441	Under frequency increase power 0 power frequency point	U16	Hz	0.01	RW
45443	Under voltage increase power mode： 0 = None 1 = Fixed increase ratio, non – hysteresis 2 = Fixed increase ratio, hysteresis 3 = Not fixed increase ratio, non – hysteresis 4 = Not fixed increase ratio, hysteresis	E16	-	-	RW
45444	Under voltage increase power: Start voltage	U16	%Un	0.01	RW
45445	Under voltage increase power: Stop voltage	U16	%Un	0.01	RW
45446	Under voltage increase power:	U16	%Un	0.01	RW

	Back voltage				
45447	The increase ratio of under voltage increase power	U16	%Pnor%Pm	0.01	RW
45448	Under voltage increase power delay time	U16	s	0.1	RW
45449	Under voltage increase power delay time	U16	s	0.1	RW
45450	Speed of under voltage recover to Pn	U16	%Pn/min	0.01	RW
45451	Pav(*)	S16	%Pn	0.01	RW
45452	DRMs Pval(*)	U16	%Pn	0.01	RW
45501	Reactive power control mode： 0 = None 1 = Fixed power factor 2 = cos φ(P) curve 3 = Fixed Q value 4 = Fixed Q value of AU DRMs 5 = Linear Q(U) curve 6 = Hysteresis Q(U) curve 7 = Taiwan's autonomous control and regulation	E16	-	-	RW
45502	Time constant of reactive power curve	U16	s	1.0	RW
45503	Power factor	S16	-	0.0001	RW
45504	cos φ(P) curve： Active power of the first point	U16	%Pn	0.01	RW
45505	cos φ(P) curve： cos φ of the first point	S16	-	0.0001	RW
45506	cos φ(P) curve： Active power of the second point	U16	%Pn	0.01	RW
45507	cos φ(P) curve： cos φ of the second point	S16	-	0.0001	RW
45508	cos φ(P) curve：	U16	%Pn	0.01	RW

	Active power of the third point				
45509	cos φ(P) curve： cos φ of the third point	S16	-	0.0001	RW
45510	cos φ(P) curve： Active power of the fourth point	U16	%Pn	0.01	RW
45511	cos φ(P) curve： cos φ of the fourth point	S16	-	0.0001	RW
45512	Lock in voltage (for cos φ(P) curve）	U16	%Un	0.01	RW
45513	Lock out voltage (for cos φ(P) curve)	U16	%Un	0.01	RW
45516	Q Set Value	S16	%Sn	0.01	RW
45518	Q(U) curve： U of the first point	U16	%Un	0.01	RW
45519	Q(U) curve： Q of the first point	S16	%Sn	0.01	RW
45520	Q(U) curve： U of the second point	U16	%Un	0.01	RW
45521	Q(U) curve： Q of the second point	S16	%Sn	0.01	RW
45522	Q(U) curve： U of the third point	U16	%Un	0.01	RW
45523	Q(U) curve： Q of the third point	S16	%Sn	0.01	RW
45524	Q(U) curve： U of the fourth point	U16	%Un	0.01	RW
45525	Q(U) curve： Q of the fourth point	S16	%Sn	0.01	RW
45526	Lock in power （for Q(U) curve）	U16	%Pn	0.01	RW
45527	Lock outpower （for Q(U) curve）	U16	%Pn	0.01	RW
45601	LVRT reactive current cal-culation mode： 0 = None 1 = GB/T 19964	E16	-	-	RW

	2 = BDEW				
45602	LVRT three phase fault reactive current limit	U16	%In	0.01	RW
45603	LVRT single/double phase fault reactive current limit	U16	%In	0.01	RW
45604	LVRT fault detection voltage type： 0 = Phase voltage 1 = Line voltage 2 = Positive sequence voltage	E16	-	-	RW
45605	Threshold of insensitive area of positive sequence voltage jump	U16	%Un	0.1	RW
45606	LVRT Trigger voltage	U16	%Un	0.01	RW
45607	K-factor of positive sequence reactive current	U16	-	0.01	RW
45608	reactive power maintenance after LVRT voltage recovery	U16	ms	1	RW
45609	LVRT active power limit mode： 0 = Active power first 1 = Active power reduced to below 10% In 2 = Unlimited active power	E16	-	-	RW
45610	HVRT reactive current calculation mode： 0 = None 1 = GB/T 19964 2 = BDEW	E16	-	-	RW
45611	HVRT three phase fault reactive current limit	U16	%In	0.01	RW
45612	HVRT single/double phase fault reactive current limit	U16	%In	0.01	RW
45613	HVRT fault detection voltage type:	E16	-	-	RW

	0 = Phase voltage 1 = Line voltage 2 = Positive sequence voltage				
45614	Threshold of insensitive area of negative sequence voltage jump	U16	%Un	0.1	RW
45615	HVRT Trigger voltage	U16	%Un	0.01	RW
45616	K-factor of negative sequence reactive current	U16	-	0.01	RW
45617	reactive power maintenance after HVRT voltage recovery	U16	ms	1	RW
45618	HVRT active power limit mode: 0 = Active power first 1 = Active power reduced to below 10% In 2 = Unlimited active power	E16	-	-	RW
45619	Zero current threshold	U16	%Un	0.01	RW
46520	AFCI self-test status: 0 = self-test failed 1 = self-test successful	E16	-	-	RO
46521	AFCI detection sensitivity settings: 0 = high detection accuracy 1 = low detection accuracy	E16	-	-	RW
46522	AFCI fault reset method selection: 0 = automatic mode 1 = manual mode	E16	-	-	RW
46523	Reset faults manually: 0 = no need 1 = Manual clear fault (active in arc fault and manual reset mode)	E16	-	-	RW

CT Data

46401	Phase 1 line to neutral volts	U16	V	0.1	RW
46402	Phase 2 line to neutral volts	U16	V	0.1	RW
46403	Phase 3 line to neutral volts	U16	V	0.1	RW
46404	Phase 1 current	U16	A	0.1	RW
46405	Phase 2 current	U16	A	0.1	RW
46406	Phase 3 current	U16	A	0.1	RW
46407	Phase 1 power	S32	w	1	RW
46409	Phase 2 power	S32	w	1	RW
46411	Phase 3 power	S32	w	1	RW
46413	Phase 1 volt amps	U32	VA	1	RW
46415	Phase 2 volt amps	U32	VA	1	RW
46417	Phase 3 volt amps	U32	VA	1	RW
46419	Phase 1 volt amps reactive	S32	Var	1	RW
46421	Phase 2 volt amps reactive	S32	Var	1	RW
46423	Phase 3 volt amps reactive	S32	Var	1	RW
46425	Phase 1 power factor	S16	-	0.01	RW
46426	Phase 2 power factor	S16	-	0.01	RW
46427	Phase 3 power factor	S16	-	0.01	RW
46428	Phase 1 phase angle	U16	°	1	RW
46429	Phase 2 phase angle	U16	°	1	RW
46430	Phase 3 phase angle	U16	°	1	RW
46431	Average line to neutral volts	U16	V	0.1	RW
46432	Average line current	U16	A	0.1	RW
46433	Sum of line currents	U16	A	0.1	RW
46434	Total systempower	S32	w	1	RW
46436	Total systemvolt amps	U32	VA	1	RW
46438	Total system VAr	S32	Var	1	RW
46440	Total systempower factor	S16	-	0.01	RW

46441	Total systemphase angle	U16	°	1	RW
46442	Frequency of supply voltages	U16	Hz	0.01	RW
46443	Import Wh since last reset	U32	Wh	1	RW
46445	Export Wh since last reset	U32	Wh	1	RW
46447	Import Varh since last reset	U32	Varh	1	RW
46449	Export Varh since lastreset	U32	Varh	1	RW

(*) ------ Supported on some models
31601~31681，41102~41156 Special for storage inverter

3.4   Warning and Error Codes

Warning Code	Description
0	No warning
30	Recover from warning
150	SPD Damaged
156	Internal fan warning
157	External fan warning
163	String current abnormal
165	Ground connect warning
166	CPU self-test ---- Register abnornal
167	CPU self-test ---- RAM abnornal
168	CPU self-test ---- ROM abnornal
174	Low Air Temprature
175	Battery Soc Low
176	Battery Fault Status
177	Battery Communication DisConnect
178	EPS Output Over
179	Combox and Cloud Disconnect
180	PV string inverse

Error Code	Description
1	Communication Fails between M-S
3	Relay check Fail
4	DC Injection High
5	The result of Auto Test Function is fail
6	DC bus is too high
8	AC HCT Failure
9	GFCI Device Failure
10	Device fault
32	ROCOF Fault
33	Fac Faulure :Fac Out of Range
34	AC Voltage Out of Range
35	Utility Loss
36	GFCI Failure
37	PV Over Voltage
38	Isolation Fault
40	Over temperature in Inverter
41	Consistent Fault :Vac differs for M-S
42	Consistent Fault :Fac differs for M-S
43	Consistent Fault :Groud I differs for M-S
44	Consistent Fault :DC inj. Differs for M-S
45	Consistent Fault :Fac,Vac differs for M-S
46	High DC bus
47	Consistent Fault
48	Average volt of ten minutes Fault
49	PV1 lightning arrester fault
50	PV2 lightning arrester fault
51	Fuse failure
52	Neutral line loss fault

53	Insulation impedance test: before enabling the constant current source, the sampling value of insulation impedance measurement voltage is greater than 300mV
54	Insulation impedance detection: after enabling constant current source, the sampling value of insulation impedance measurement voltage is out of range (1.37V±20%)
55	Insulation impedance detection: N-PE relay switches, and the instantaneous value of insulation impedance measurement voltage is less than 40mV
56	GFCI protect fault:30mA level
57	GFCI protect fault:60mA level
58	GFCI protect fault:150mA level
59	PV1 string current is abnormal
60	PV2 string current is abnormal
61	DRMS Communication Fails(S9 Open)
62	DRMS order disconnection device(S0 Close)
63	L-PE short-circuit protection error
64	PV input mode error
65	PE connection Fault
66	PV1 reverse connection fault
67	PV2 reverse connection fault
68	PV3 reverse connection fault
69	External input failure
70	AFCI self-test failure (including self-test circuit and CAN circuit failure)
71	AFCI failure (PV1-10)
72	Parallel 485 communication fault
73	Parallel CAN communication fault

3.5 Grid Codes

Grid Code	Description
8	GR PPC
35	NB/T32004:2018
47	AU AS 4777.2 : 2015
48	NZ AS 4777.2 : 2015
49	ENGG-50Hz
50	ENGG-60Hz
51	TOR Erzeuger Typ A V1.1
59	CNS15382:2018
64	EN 50549-1
65	NL EN50549-1:2019
66	BR NBR 16149:2013
67	VDE0126-1-1/A1/VFR
68	IEC 61727 50Hz
69	C10/11:2019
70	VDE-AR-N4105:2018
71	IEC 61727 60Hz
72	G98/1
73	G99/1
74	AU AS/NZS4777.2:2020 A
75	AU AS/NZS4777.2:2020 B
76	AU AS/NZS4777.2:2020 C
77	NZ AS/NZS4777.2:2020
78	IL SI4777.3
79	KR KS C 8565:2020
80	ES UNE206007-1
81	CY EN50549-1
82	CS PPDS A1
83	PL EN50549-1

84	CEI 0-21:2019
85	DK EN50549-1
86	CH NA/EEA-NE7
87	SE EIFS:2018
88	FI EN50549-1
89	RO Order208
90	SI EN50549-1
91	LV EN50549-1
92	VDE0126/VFR2019 IS (50Hz)
93	VDE0126/VFR2019 IS (60Hz)
94	ZA NRS 097-2-1:2017
95	BR PORTARIA No.140
96	NTS 631 Type A
97	NTS 631 Type B
98	NO EN50549-1
99	VDE-AR-N 4110
100	EN 50549-2
101	DEWA:2016
102	DK1 EN50549-1
103	ZA RPPs

3.6   Frame format

MODBUS protocol format: RTU format. Each communication data unit is composed of 1 bit starting bit, 8 bit data bit and 1 bit stopping bit, no parity .

MODBUS function codes:

- Read Holding Register (0x03)
- Read Input Register (0x04)
- Write Holding Single Register (0x06)
- Write Holding Multiple Registers (0x10)
- Write Holding Multiple Registers (0x10) for broadcast

3.6.1   Read Holding Register (Function Code: 0x03)

Request:

Device ID	1 Byte
Function code	1 Byte
Register Address(Hi)	1 Byte
Register Address(Lo)	1 Byte
Register length	2 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

Response:

Device ID	1 Byte
Function code	1 Byte
Byte count	1 Byte
Data	N × 1 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

Error：

Device ID	1 Byte
Function code + 0x80	1 Byte
Exception code	1 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

3.6.2   Read Input Register (Function Code: 0x04)

Request:

Device ID	1 Byte
Function code	1 Byte
Register Address(Hi)	1 Byte
Register Address(Lo)	1 Byte
Register length	2 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

Response:

Device ID	1 Byte
Function code	1 Byte
Byte count	1 Byte
Data	N × 1 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

Error：

Device ID	1 Byte
Function code + 0x80	1 Byte
Exception code	1 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

3.6.3 Write Single Holding Register (Function Code: 0x06)

Request:

Device ID	1 Byte
Function code	1 Byte
Register Address(Hi)	1 Byte
Register Address(Lo)	1 Byte
Data	2 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

Response:

Device ID	1 Byte
Function code	1 Byte
Register Address(Hi)	1 Byte
Register Address(Lo)	1 Byte
Data	2 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

Error:

Device ID	1 Byte
Function code + 0x80	1 Byte
Exception code	1 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

3.6.4 Write Multiple Holding Registers (Function Code: 0x10)

Request:

Device ID	1 Byte
Function code	1 Byte
Register Address(Hi)	1 Byte
Register Address(Lo)	1 Byte
Register length	2 Byte
Data length	1 Byte
Data	N × 1Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

Response:

Device ID	1 Byte
Function code	1 Byte
Register Address(Hi)	1 Byte
Register Address(Lo)	1 Byte
Register length	2 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

Error:

Device ID	1 Byte
Function code + 0x80	1 Byte
Exception code	1 Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

3.6.5 Write Multiple Holding Registers (Function Code: 0x10) for broadcast

Request:

Device ID	1 Byte
Function code	1 Byte
Register Address(Hi)	1 Byte
Register Address(Lo)	1 Byte
Register length	2 Byte
Data length	1 Byte
Data	N × 1Byte
CRC(Lo)	1 Byte
CRC(Hi)	1 Byte

Response: none

3.6.6 Exception Codes

0x01   Illegal function

0x02   Illegal address

0x03   Illegal data

0x04   Slave device failure

4   Contact

If you experience any technical problems with our products, please contact the AISWEI Service Hotline to provide you with the necessary assistance:

AISWEI Technology Co., Ltd.

Room 905B, 757 Mengzi Road, Huangpu District

200023 Shanghai(P.R. China)