Ingeteam

INGECON SUN STORAGE 1PLAY TL M

INPUT REGISTERS

ABH2010IMB08_H.docx

Table of contents

1 INPUT REGISTERS (REG. 30000)

1.1 INPUT REGISTERS

Modbus Register	Description		Type	Since FW Ver.
30001	Current Date. Year		UINT16	
30002	Current Date. Month		UINT16	
30003	Current Date. Day		UINT16	
30004	Current Date. Hour		UINT16	
30005	Current Date. Minute		UINT16	
30006	Current Date. Second		UINT16	
30007	Inverter. Total operation time	[h]	UINT32	
30008				
30009	Reserved for Ingeteam		-----	
30010	Stop Event	[Note 1]	UINT16	
30011	Alarms	[Note 1]	UINT32	
30012				
30013	Code 1	[Note 1]	UINT16	
30014	Code 2	[Note 1]	UINT16	
30015	Code 3	[Note 1]	UINT16	
30016	Inverter Status	[Note 2]	UINT16	
30017	Waiting Time to Connect to Grid	[sec]	UINT16	
30018	Battery. Voltage	[V x 10]	UINT16	
30019	Battery. Current	[A x 100]	INT16	
30020	Battery. Power	[W]	INT16	
30021	Battery. SOC	[%]	UINT16	
30022	Battery. SOH	[%]	UINT16	
30023	Battery. Charging Voltage	[V x 10]	UINT16	
30024	Battery. Discharging Voltage	[V x 10]	UINT16	
30025	Battery. Max. Charging Current	[A x 100]	UINT16	
30026	Battery. Max. Discharging Current	[A x 100]	UINT16	
30027	Battery. Status	[Note 3]	UINT16	
30028	Battery. Temperature	[ºC x 10]	INT16	
30029	Battery. BMS Alarms	[Note 4]	UINT16	
30030	Battery. Discharge Limitation Reason	[Note 9]	UINT16	
30031	Battery. Voltage Internal Sensor	[V x 10]	UINT16	
30032	PV1. Voltage	[V]	UINT16	
30033	PV1. Current	[A x100]	UINT16	

30034	PV1. Power	[W]	UINT16	
30035	PV2. Voltage	[V]	UINT16	
30036	PV2. Current	[A x100]	UINT16	
30037	PV2. Power	[W]	UINT16	
30038	Inverter. Active Power	[W]	INT16	
30039	Inverter. Reactive Power	[Var, Note 5]	INT16	
30040	Inverter. Cosφ	[x1000, Note 6]	INT16	
30041	Active Power Reduction Ratio	[% x10]	UINT16	
30042	Active Power Reduction Reason	[Note 7]	UINT16	
30043	Reactive Power Set-Point Type	[Note 8]	UINT16	
30044	Critical Loads. Voltage	[V]	UINT16	
30045	Critical Loads. Current	[A x100]	UINT16	
30046	Critical Loads. Frequency	[Hz x100]	UINT16	
30047	Critical Loads. Active Power	[W]	INT16	
30048	Critical Loads. Reactive Power	[Var, Note 5]	INT16	
30049	Internal Wattmeter Grid. Voltage	[V]	UINT16	
30050	Internal Wattmeter Grid. Current	[A x100]	UINT16	
30051	Internal Wattmeter Grid. Frequency	[Hz x100]	UINT16	
30052	Internal Wattmeter Grid. Active Power	[W]	INT16	
30053	Internal Wattmeter Grid. Reactive Power	[Var, Note 5]	INT16	
30054	Internal Wattmeter Grid. Cosφ	[x1000, Note 6]	INT16	
30055	DC Bus Voltage	[V]	UINT16	
30056	Reserved			
30057	Reserved			
30058	Temperature. Internal Inverter	[ºC x10]	INT16	
30059	Reserved			
30060	Positive Isolation Resistance	[kOhm]	UINT16	
30061	Negative Isolation Resistance	[kOhm]	UINT16	
30062	RMS Differential Current	[mA x10]	UINT16	_P
30063	Digital Output 1. Status	[0: OFF, 1:ON]	UINT16	
30064	Digital Output 2. Status	[0: OFF, 1:ON]	UINT16	
30065	Digital Input DRM0. Status	[0: OFF, 1:ON]	UINT16	
30066	Digital Input 2. Status	[0: OFF, 1:ON]	UINT16	
30067	Digital Input 3. Status	[0: OFF, 1:ON]	UINT16	
30068	Reserved for Ingeteam		-----	
30069	Battery. BMS Flags	[Note 10]	UINT16	_B
30070	External Wattmeter Grid. Voltage	[V]	UINT16	_F

30071	External Wattmeter Grid. Frequency [Hz x10]	UINT16	_F
30072	External Wattmeter Grid. Active Power [W]	INT16	_F
30073	External Wattmeter Grid. Reactive Power [Var]	INT16	_F
30074	Battery. BMS Warnings [Note 11]	UINT16	_K
30075	Battery. BMS Errors [Note 11]	UINT16	_K
30076	Battery. BMS Faults [Note 11]	UINT16	_K
30077	Battery. BMS Protections [Note 11]	UINT16	_K
30078	Battery. Charge Limitation Reason [Note 9]	UINT16	_L
30079	Total Loads. Active Power (Critical + No Critical) [W]	UINT16	_L
30080	External PV. Power (Ingeteam Inverters) [W]	UINT16	_L
30081	EV Charger. Active Power [W]	INT16	_N

NOTES:

- **Note 1:** Check ABH2010IMC14 document. Alarm Interpretation and Troubleshooting Guide."
- **Note 2:** ***Inverter Status***. Check the following Table.

Number	Description
0	Inverter Stopped
1	Starting
2	Off-grid
3	On-grid
4	On-grid (Standby Battery)
5	Waiting to connect to Grid
6	Critical Loads Bypassed to Grid
7	Emergency Charge from PV
8	Emergency Charge from Grid
9	Inverter Locked waiting for Reset
10	Error Mode

- **Note 3:** ***Battery Status***. Check the following Table.

Number	Description
0	Standby
1	Discharging
2	Constant Current Charging
3	Constant Voltage Charging
4	Floating
5	Equalizing
6	Error Communication with BMS
7	No Configured
8	Capacity Calibration (Step 1)
9	Capacity Calibration (Step 2)
10	Standby Manual

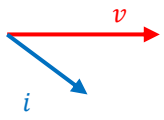
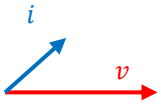
- **Note 4:** ***Battery BMS Alarms*** (bits)

Bit	Description
0	High Current Charge
1	High Voltage
2	Low Voltage
3	High Temperature
4	Low Temperature
5	BMS Internal

6	Cell Imbalance
7	High Current Discharge
8	System BMS Error

- **Note 5:** Reactive sign convention.

  With reactive power is positive values the current will be delayed from voltage. Otherwise, if reactive power is negative values the current will be leading the voltage.

Type of current	Effect on the grid	Reactive sign	Tangent / Cosine sign	Fasorial diagram
The current is delivered lagging from the voltage	The grid voltage goes up.	Q > 0	Positive	
The current is delivered leading from the voltage	The grid voltage goes down.	Q < 0	Negative	

- **Note 6:** Phi cosine is given in absolute value. Check reactive power to get the sign.
- **Note 7:** ***Active Power Reduction Reason:***

Number	Description
0	No limitation
1	Communication
2	PCB Temperature
3	Heat Sink Temperature
4	Pac vs Fac Algorithm
5	Soft Start
6	Charge Power Configured
7	PV Surplus injected to the Loads
8	Pac vs Vac Algorithm
9	Battery Power Limited
10	AC Grid Power Limited
11	Self-Consumption Mode
12	High Bus Voltage Protection
13	LVRT or HVRT Process
14	Nominal AC Current
15	Grid Consumption Protection
16	PV Surplus Injected to the Grid

- **Note 8:** ***Reactive Power Set Point Type***:

Number	Description
0	Cos(φ) Configuration
1	Qac Communication
2	Cos(φ) Communication

3	Qac vs Vac Algorithm
4	Cos(φ) vs Pac Algorithm

- **Note 9:** ***Battery Charge/Discharge Limitation Reason:***

Number	Description
0	No limitation
1	Heat Sink Temperature
2	PT100 Temperature
3	Low Bus Voltage Protection
4	Battery Settings
5	BMS Communication
6	SOC Max Configured
7	SOC Min Configured
8	Maximum Battery Power
9	Modbus Command
10	Digital Input 2
11	Digital Input 3
12	PV charging scheduling

- **Note 10:** ***Battery BMS Flags:***

Bit	Definition	Description
0	Stop Charge	Set when charge is not allowed
1	Stop Discharge	Set when discharge is not allowed
2	Forced Charge	Set when SOC get in the certain range defined by BMS
3	Calibration	Set when BMS need calibrate SOC

- **Note 11:** ***Battery BMS Warnings, Errors, Faults and Protections:***
  They are showed in hexadecimal format. The meaning of the codes is defined from the battery manufacturer.

1.2 FUNCTION 0x04: READ INPUT REGISTERS

Function 0x04 allows reading online data or Input Registers (references 3xxxx) from the inverter. The registers are redirected starting with the register number 1, which in the memory address is the position 0. Within the Input Registers map it can be read whatever part of the memory.

The master sends a Query message to the inverter. It asks the number, 0xNHNL, of Input Registers starting in the address 0xFHFL.

Address	--	Inverter Address[1 .. 247]
Function	0x04	Read Input Registers
Starting Address Hi	0xFH	Address of 1st register (HI byte)
Starting Address Lo	0xFL	Address of 1st register (LO byte)
Number of Points Hi	0xNH	Number of registers to read (HI byte)
Number of Points Lo	0xNL	Number of registers to read (LO byte)
Error Check (CRC) - Hi	--	Cyclic Redundancy Code (HI byte)
Error Check (CRC) - Lo	--	Cyclic Redundancy Code (LO byte)

The inverter answer sending the following Response message, which includes the values of the 0xNHNL configuration parameters (2 bytes per register [0xNN])

Address	--	Inverter address[1 .. 247]
Function	0x04	Read Input Registers
Byte Count	0xNN	Number of data octets
Data Hi	--	Value of *register 1* (HI byte)
Data Lo	--	Value of *register 1* (LO byte)
Data Hi	--	…
Data Lo	--	…
Data Hi	--	Value of *register n* (HI byte)
Data Lo	--	Value of *register n* (LO byte)
Error Check (CRC) - Hi	--	Cyclic Redundancy Code (HI byte)
Error Check (CRC) - Lo	--	Cyclic Redundancy Code (LO byte)

2 REVISION HISTORY

Revision	Date	Change Description	Author
_	20/12/2019	Initial document	D.B.R.
_A	21/04/2020	Inverter Status [Note 2] modified	D.B.R.
_B	12/06/2020	Battery Power Reduction Reason [30030] added Battery BMS Flags [30069] added	D.B.R.
_C	23/12/2020	Battery BMS Alarms [Note 4] completed	D.B.R.
_D	17/05/2021	External Wattmeter Grid [30070 – 30073] added	D.B.R.
_E	22/02/2022	Battery BMS Warning – Error added [30074 – 30077]	D.B.R.
_F	22/06/2022	Battery BMS Warning – Error completed	D.B.R.
_G	23/09/2022	Battery Discharge Limitation Reason [30030] modified Battery Charge Limitation Reason [30078] added Temperature. Internal Inverter [30058] added Total Loads. Active Power (Critical + No Critical) [30079] added External PV. Power (Ingeteam Inverters) [30080] added	D.B.R.
_H	02/01/2023	EV Charger. Active Power [30081] added RMS Differential Current [30062] changed to mA x10	D.B.R.