INGECON SUN STORAGE 1PLAY
INPUT REGISTERS

ABH2010IMB02_K

Ingeteam Power Technology S.A.

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INDEX

1. INPUT REGISTERS (REG. 30000)

1.1 INPUT REGISTERS

Modbus Register	Description		Type	Since FW Ver.
30001	Current Date. Year		UINT16	_A
30002	Current Date. Month		UINT16	_A
30003	Current Date. Day		UINT16	_A
30004	Current Date. Hour		UINT16	_A
30005	Current Date. Minute		UINT16	_A
30006	Current Date. Second		UINT16	_A
30007 30008	Total operation time	[h]	UINT32	_A
30009	Inverter Code 1	[Hex]	UINT16	_A
30010	Inverter Code 2	[Hex]	UINT16	_A
30011 30012	Inverter Alarms	[Hex]	UINT32	_A
30013	Inverter Status (1)		UINT16	_W
30014	Inverter AC Phase Configuration (2)		UINT16	_A
30015	Battery. Voltage	[V x10]	UINT16	_T
30016	Battery. Current	[A x100]	INT16	_A
30017	Battery. Power	[W]	INT16	_A
30018	Battery. SOC	[%]	UINT16	_A
30019	Battery. SOH	[%]	UINT16	_A
30020	Battery. Max. Charging Current	[A x100]	UINT16	_A
30021	Battery. Max. Discharging Current	[A x100]	UINT16	_A
30022	Battery. Status(3)		UINT16	_Y
30023	Battery. Temperature	[ºC x10]	INT16	_A
30024	PV. Voltage	[V]	UINT16	_A
30025	PV. Current	[A x100]	UINT16	_A
30026	PV. Power	[W]	UINT16	_A
30027	AC Loads. Voltage	[V]	UINT16	_A
30028	AC Loads. Current	[A x100]	UINT16	_A
30029	AC Loads. Frequency	[Hz x100]	UINT16	_A
30030	AC Loads. Active Power	[W]	INT16	_A
30031	AC Loads. Reactive Power(8)	[VAr]	INT16	_A
30032	Inverter. Phi Cosine(9)	[x1000]	INT16	_A
30033	Inverter. Active Power	[W]	INT16	_A

30034	Inverter. Reactive Power(8)	[VAr]	INT16	_A
30035	Grid/Genset. Voltage	[V]	UINT16	_A
30036	Grid/Genset. Current	[A x100]	UINT16	_A
30037	Grid/Genset. Frequency	[Hz x100]	UINT16	_A
30038	Grid/Genset. Active Power	[W]	INT16	_A
30039	Grid/Genset. Reactive Power(8)	[VAr]	INT16	_A
30040	DC Bus Voltage	[V]	UINT16	_A
30041	Temperature. Heatsink	[ºC x10]	INT16	_A
30042	Temperature. I.C.	[ºC x10]	INT16	_A
30043	Temperature. PT100	[ºC x10]	INT16	_A
30044	Positive Isolation Resistance	[kOhm]	UINT16	_A
30045	Negative Isolation Resistance	[kOhm]	UINT16	_A
30046	Digital Output. 1 Status(4)		UITN16	_A
30047	Digital Output. 2 Status(4)		UINT16	_A
30048	Battery. BMS Alarms	[Note 11]	UINT16	AH
30049	Residual Current	[mA]	UINT16	_U
30050	Digital Input. 1 Status(5)		UINT16	_A
30051	Digital Input. 2 Status(5)		UINT16	_U
30052	Reserved		-----	-----
30053	Battery. Charging Voltage	[V x10]	UINT16	_U
30054	Battery. Discharging Voltage	[V x10]	UINT16	_U
30055	Grid/Genset. Phi Cosine(9)	[x1000]	INT16	_U
30056	Inverter Code 3	[Hex]	UINT16	_X
30057	Last Stop Events(10)	[binary]	UINT32	_V
30058				
30059	Reserved for Ingeteam		-----	-----
30060	Active Power Reduction Reason (6)		UINT16	_U
30061	Active Power Reduction Ratio	[% x10]	UINT16	_A
30062	Reactive Power Set-Point Type(7)		UINT16	_A
30063	Reserved		-----	-----
30064	Reserved		-----	-----

NOTES:

0: Internal Bypass Opened 1: Internal Bypass Closed	0: Not emergency charge 1: Emergency charge	0: Not waiting to connect to the grid 1: Waiting to connect to the grid	0: Voltage source 1: Current source	0: Stand-by Off 1: Stand-by On	0: Inverter Stopped 1: Inverter Running	0: Disconnected from the grid 1: Connected to the grid	(1) **Inverter Status**
Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
0	0	0	0	0	0	0	Stopped
1	0	0	0	0	0	0	Internal Bypass Closed
0	1	0	0	0	0	0	Emergency Charge from PV input
0	0	0	0	0	1	0	Off-grid
0	0	1	0	0	1	0	Waiting to connect
0	0	0	1	0	1	1	On-grid
0	0	0	1	1	1	1	On-grid (standby)
0	1	0	1	0	1	1	Emergency Charge from AC input

(2) **Inverter AC Phase Configuration**	**Number**	**Description**
	0	Single Phase
	1	Phase R
	2	Phase S
	3	Phase T

(3) **Battery Status**	**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)

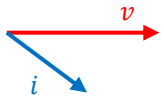
(4) **Digital Output. 1 Status** **Digital Output. 2 Status**	**Number**	**Description**
	0	OFF
	1	ON

[5] Digital Input.1 Status Digital Input.2 Status	Number	Description
	0	OFF
	1	ON

[6] 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	Configuration Limited
	7	Self-consumption by ISS 1Play
	8	Pac vs Vac Algorithm
	9	Battery Power Limited
	10	Genset Power Limited
	11	Pac vs VacAvg Algorithm
	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

[7] 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

[8] **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	

[9] **Phi Cosine sign convention.** Phi Cosine is given in absolute value.

(10) Last Stop Events. Stop event is defined by a 32 bit code, where the bit position means the number of the stop event.

An example, with the two stop event (1 and 10) is included below:

Stop event 1 and 10	=	0000	0000	0000	0000	0000	00**1**0	0000	000**1**

Note 11: ***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

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
_	13/03/2015	Initial document	D.B.R.
_A	14/08/2015	Modbus register 30020 Battery. Max. Charging Current units are corrected from [A] to [hundredths of A]. Modbus register 30021 Battery. Max. Discharging Current units are corrected from [A] to [hundredths of A].	D.B.R.
_B	10/10/2016	Modbus register 30060 and 30061 names have been changed to clarify the action: - Active Power Reduction Reason → Active Power Set-Point Type - Active Power Reduction Ratio → Active Power Set-Point Ratio Modbus register 30046, 30047 and 30050 have been changed to clarify the action. This registers show the current status of the digital output/input. - Digital Output. 1 Status - Digital Output. 2 Status - Digital Input. 1 Status	D.B.R.
_C	09/02/2017	Modbus register 30015 Battery.Voltage units is corrected form [V] to [tenths of V].	D.B.R.
_D	08/05/2017	Modbus register 30013 Inverter Status has been updated. Modbus register 30049 Residual Current added. Modbus register 30051 Digital Input 2 Status added. Modbus register 30053 Battery Charging Voltage added. Modbus register 30054 Battery Discharging Voltage added. Modbus register 30055 Grid/Genset. Phi Cosine added. Modbus registers from 30056 to 30059 have been changed for reserved. Modbus register 30060 Active Power Reduction Reason has been updated. Modbus register 30062 Reactive Power Set-Point Type has been updated. Modbus registers 30063 and 30064 have been changed for reserved. Note (8) Reactive sign convention added. Note (9) Phi Cosine sign convention added.	D.B.R.
_E	05/06/2017	Added Active Power Reduction Reason → PV Surplus Injected to the Grid (16).	D.B.R.
_F	28/07/2017	Modbus register 30057/30058 Last Stop Events added.	D.B.R.
_G	15/09/2017	Modbus register 30013 Inverter Status has been updated. Added a new Inverter Status → Emergency charge from PV. Modbus register 30059 has been reserved for Ingeteam.	D.B.R.
_H	17/11/2017	Modbus register 30013 Inverter Status has been updated. Added a new Inverter Status → Internal Bypass.	D.B.R.
_I	15/03/2018	Modbus register 30056 Inverter Code 3 added.	D.B.R.
_J	20/06/2018	Modbus register 30013 Inverter Status has been updated (Emergency Charge from AC input)	D.B.R.

_K	19/02/2021	Modbus register 30048 Battery. BMS Alarms has been added	D.B.R.