



R&D STANDARDS

FEASIBILITY AND USER REQUIREMENTS DOCUMENTS
FUNCTIONALITY SPECIFICATIONS

AAA0030IMB02_O.docx

ONLINE DATA INPUT REGISTER LIST

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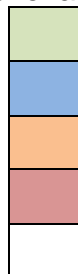
1. INTRODUCTION

This document describes the range of registers describing the so-called Online data for every application. This data are data which provide information from the unit focused to be polled periodically either by an S.C.A.D.A. or any other device.

2. ONLINE DATA. START ADDRESS (0000- 0124)

The address range 0000-0124 is dedicated to the parameters on-line standard of the different INGETEAM UNITS. For every application or firmware dedicated the following parameters are described:

- Start Address: address to be written in the RTU modus frame to access the register.0000-65535.
- Modbus Modicon Address: Regarding Input register mapping,in the range of start addresses 0-9998, Modicon convention maps the global map to an equivalent address range of 300001-39999.
- Description: Description and format type of the input register.
- Magnitude: Magnitude of the register to read and factor to apply.
- Usual Minimum value: An approximate minimum value to indicate the visualization of that limit to show it.
- Usual Maximum value: An approximate maximum value to indicate the visualization of that limit to show it.
- Firmware version: Version of firmware in which the parameter is created.
- Level access. The level access is coded by color.



Green color: User.

Blue color: Installer.

Orange color: Service.

Red color: Ingeteam.

White color: Not used, should not be visible.

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3. STRING KIT DATA. START ADDRESS (0860- 0984)

The address range 0860-0984 is dedicated to string kit data. For every application or firmware dedicated, the following parameters are described:

- Start Address: address to be written in the RTU modus frame to access the register.0000-65535.
- Modbus Modicon Address: Regarding Input register mapping,in the range of start addresses 0-9998, Modicon convention maps the global map to an equivalent address range of 300001-39999.
- Description: Description and format type of the input register.
- Magnitude: Magnitude of the register to read and factor to apply.
- Usual Minimum value: An approximate minimum value to indicate the visualization of that limit to show it.

- Usual Maximum value: An approximate maximum value to indicate the visualization of that limit to show it.
- Firmware version: Version of firmware in which the parameter is created.

4. REGISTER MAP AND DESCRIPTION FOR 1PLAY HF(ABF1000)

4.1 REV.0

Start Address	MB Modicon Address	Description	Magnitude	Usual Min Value (*)	Usual Max Value (*)
0	30001	Actual Date. Year (Uint16).	Year	1900	2100
1	30002	Actual Date. Month of the Year.(Uint16).	Month	1	12
2	30003	Actual Date. Day of the month.(Uint16).	Day	1	31
3	30004	Actual Date. Hour of the day. (Uint16).	Hour	0	23
4	30005	Actual Date: Minute. (Uint16).	Minute	0	59
5	30006	Actual Date: Second. (Uint16).	Second	0	59
6	30007	Total Energy delivered by the unit. kW*h.(bits 31-16, Uint32).	kW*h	0	2^32-2
7	30008	Total Energy delivered by the unit. kW*h. (bits 15-0, Uint32).			
8	30009	Total hours of operation. hours. (high part of Uint32. Bits 31-16).	Hours	0	2^32-2
9	30010	Total hours of operation. hours. (low part of Uint32. Bits 15-0).			
10	30011	Total number of connections since launching. (high part of Uint32. Bits 31-16).	n/a	0	2^32-2
11	30012	Total number of connections since launching. (low part of Uint32. Bits 15-0).			
12	30013	Partial Energy delivered by the unit since user reset. kW*h. (high part of Uint32. Bits 31-16).	kW*h	0	2^32-2

13	30014	Partial Energy delivered by the unit since user reset. kW*h. (low part of Uint32. Bits 15-0).				
14	30015	Partial number of hours of operation. hours. (high part of Uint32. Bits 31-16).	hours	0	2^32-2	
15	30016	Partial number of hours of operation. hours. (low part of Uint32. Bits 15-0).				
16	30017	Partial number of connection since user reset. (high part of Uint32. Bits 31-16).	n/a	0	2^32-2	
17	30018	Partial number of connection since user reset. (low part of Uint32. Bits 15-0).				
18	30019	Instantaneous alarm code 1 bits .	Flag bits	0	0xFFFF	
19	30020	Instantaneous alarm code 2 bits .	Flag bits	0	0xFFFF	
20	30021	Instantaneous alarm code 3 bits .	Flag bits	0	0xFFFF	
21	30022	Instantaneous alarm code 4 bits .	Flag bits	0	0xFFFF	
22	30023	Warning code.(Uint16).	Flag bits	0	0xFFFF	
23	30024	Unit flags 1. To indicate any feature.		Flag bits	0	0xFFFF
		f0	SD Firmware Update Request			
		f1	RS485 Firmware Update Request			
		f2	Unit doing some test			
		f3	SD Firmware Update Unit State			
		f4	RS485 Firmware Update Unit State			
		f5	Unit doing test			
		f6				
		f7				
		f8				
		f9				
		f10				
f11						

		f12				
		f13				
		f14				
		f15				
24	30025	Unit flags 2. To indicate any feature.		Flag bits	0	0xFFFF
		f0	FW update result bit 0			
		f1	FW update result bit 1			
		f2	FW update result bit 2			
		f3	FW update result bit 3			
		f4	updateDisplayFWinfo			
		f5				
		f6				
		f7				
		f8				
		f9				
		f10				
		f11				
		f12				
		f13				
		f14				
		f15				
25	30026	Unit flags 3. To indicate any feature.		Flag bits	0	0xFFFF
26	30027	Status Unit 1		States	0	2
		0	Not Ready to Connect			
		1	Waiting to Connect			
		2	Connected to the Grid			

27	30028	Status Unit 2		States	0xFFFF	0xFFFF
28	30029	Status Unit 3		States	0xFFFF	0xFFFF
29	30030	Output grid current RMS (Uint16)		Ampsx100	0	5000
30	30031	Grid RMS voltage (Uint16).		Vrmsx10	0	3200
31	30032	Grid RMS voltage (Only split-phase grid) (Uint16).		Vrmsx10	0	3200
32	30033	Grid frequency (Uint16)		Hz x 100	0	7000
33	30034	Output apparent power (Int16)		VA	0	7000
34	30035	Output active power (Int16).		Watt	-1000	7000
35	30036	Output reactive power (Int16).		VAr	-7000	7000
36	30037	Cosine of Phi. (Int16)		x1000	-1000	1000
37	30038	PV current (Int16).		Ampsx100	-100	4000
38	30039	Reserved		-	0xFFFF	0xFFFF
39	30040	PV voltage (Int16)		Vdc	0	1200
40	30041	Reserved		-	0xFFFF	0xFFFF
41	30042	PV power (Int16).		Wat	-100	7000
42	30043	Reserved		-	0xFFFF	0xFFFF
43	30044	Reserved		-	0xFFFF	0xFFFF
44	30045	Isolation resistance of PV field		kOhm	0	65
45	30046	Wattmeter measurement (Self-Consumption mode)(Int16)		Watt	-3200	3200
46	30047	Active Power Reduction rate		%	0	100

47	30048	Active Power Reduction Reason		Reason	0	12
		0	Not reduction ()			
		1	Not reduction ()			
		2	Temperature (T).			
		3	Temperature (T).			
		4	Temperature (T).			
		5	Communications (C)			
		6	Grid Frequency/Active Power control (F)			
		7	Grid Voltage/Active Power control(V)			
		8	Reactive Priority and Output Current Limit(Q)			
		9	Configuration (A)			
		10	Connection Initial Ramp (R)			
		11	Self Consumption mode (S)			
12	Manufactured reserved (M)					
48	30049	Reactive Power Reference type		Reason	0	6
		0	CosPhi Configuration			
		1	Qref Manual			
		2	CosPhi Manual			
		3	Qref Communications			
		4	CosPhi Communications			
		5	Qref QvsV			
6	CosPhi CosPhiVsP					
49	30050	Daily energy value. (bits 63-32, Uint32)		KWh*100	0	0xFFFF
50	30051	Daily energy value. (bits 31-0, Uint32)				

51	30052	Self Consumption ratio	%	0	100
52	30053	Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF
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124	30125	Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF

Table 1: Register description of online address range 30001-30125 for 1Play HF.

(*)This Max/Min values are only approximated values, useful for programmers who need to know the typical range of each register.

Validation Date: 03/02/2014

Author: FJA

5. REGISTER MAP AND DESCRIPTION FOR 1PLAY TLM(ABE1000)

5.1 REV.0

Start Address	MB Modicon Address	Display order	Show when	Description	Magnitude	Usual Min Value (*)	Usual Max Value (*)
0	30001	1	Always	Actual Date. Year (Uint16).	Year	1900	2100
1	30002			Actual Date. Month of the Year.(Uint16).	Month	1	12
2	30003			Actual Date. Day of the month.(Uint16).	Day	1	31
3	30004			Actual Date. Hour of the day. (Uint16).	Hour	0	23
4	30005			Actual Date: Minute. (Uint16).	Minute	0	59
5	30006			Actual Date: Second. (Uint16).	Second	0	59
6	30007	27	Always	Total Energy delivered by the unit. kW*h.(bits 31-16, Uint32).	kW*h	0	2^32-2
7	30008			Total Energy delivered by the unit. kW*h. (bits 15-0, Uint32).			
8	30009	28	Always	Total hours of operation. hours. (bitshigh part of Uint32. Bits 31-16).	Hours	0	2^32-2
9	30010			Total hours of operation. hours. (low part of Uint32. Bits 15-0).			
10	30011	29	Always	Total number of connections since launching. (high part of Uint32. Bits 31-16).	n/a	0	2^32-2
11	30012			Total number of connections since launching. (low part of Uint32. Bits 15-0).			
12	30013	30	Always	Partial Energy delivered by the unit since user reset. kW*h. (high part of Uint32. Bits 31-16).	kW*h	0	2^32-2
13	30014			Partial Energy delivered by the unit since user reset. kW*h. (low part of Uint32. Bits 15-0).			
14	30015	31	Always	Partial number of hours of operation. hours. (high part of Uint32. Bits 31-16).	hours	0	2^32-2

15	30016			Partial number of hours of operation. hours. (low part of Uint32. Bits 15-0).				
16	30017	32	Always	Partial number of connection since user reset. (high part of Uint32. Bits 31-16).	n/a	0	2^32-2	
17	30018			Partial number of connection since user reset. (low part of Uint32. Bits 15-0).				
18	30019	2	Always	Instantaneous alarm code 1.	Flag bits	0	0xFFFF	
19	30020	3	Always	Instantaneous alarm code 2.	Flag bits	0	0xFFFF	
20	30021	4	Always	Instantaneous alarm code 3.	Flag bits	0	0xFFFF	
21	30022	5	Always	Instantaneous alarm code 4.	Flag bits	0	0xFFFF	
22	30023	6	Always	Warning code.(Uint16).	Flag bits	0	0xFFFF	
23	30024	33	Always	Unit flags 1. To indicate any feature.		Flag bits	0	0xFFFF
				f0	SD Firmware Update Request			
				f1	RS485 Firmware Update Request			
				f2	Unit doing Autotest			
				f3	SD Firmware Update Unit State			
				f4	RS485 Firmware Update Unit State			
				f5	Unit doing some test			
f6-f15	Not implemented yet							
24	30025	34	Always	Unit flags 2. To indicate any feature.		Flag bits	0	0xFFFF
				f0	FW update result bit 0			
				f1	FW update result bit 1			
				f2	FW update result bit 2			
				f3	FW update result bit 3			
				f4	updateDisplayFWinfo			
				f5-f15	Not implemented yet			

25	30026	35	Always	Unit flags 3. To indicate any feature.	Flag bits	0	0xFFFF	
26	30027	7	Always	Status Unit 1	States	0	2	
				0				Not Ready to Connect
				1				Waiting to Connect
				2				Connected to the Grid
27	30028	36	Always	Status Unit 2	States	0xFFFF	0xFFFF	
28	30029	37	Always	Status Unit 3	States	0xFFFF	0xFFFF	
29	30030	8	Always	Output grid current RMS (Uint16)	Ampsx100	0	5000	
30	30031	9	Always	Grid RMS voltage1 (Uint16).	Vrmsx10	0	3200	
31	30032	10	Always	Grid RMS voltage2 (Uint16).	Vrmsx10	0	3200	
32	30033	11	Always	Grid frequency (Uint16)	Hz x 100	0	7000	
33	30034	12	Always	Output apparent power (Int16)	VA	0	7000	
34	30035	13	Always	Output active power (Int16).	Watt	-1000	7000	
35	30036	16	Always	Output reactive power (Int16).	VAr	-7000	7000	
36	30037	17	Always	Cosine of Phi. (Int16)	x1000	-1000	1000	
37	30038	18	Always	PV1 current (Int16).	Ampsx100	-100	4000	
38	30039	19	Always	PV2 current (Int16).	Ampsx100	-100	4000	
39	30040	20	Always	PV1 voltage (Int16)	Vdc	0	1200	
40	30041	21	Always	PV2 voltage (Int16)	Vdc	0	1200	
41	30042	22	Always	PV power (Int16).	Watt	-100	7000	
42	30043	23	Always	PV1 power (Int16).	Watt	-100	7000	
43	30044	24	Always	PV2 power (Int16).	Watt	-100	7000	
44	30045	25	Always	Isolation resistance of PV field	kOhm	0	65	
45	30046	14	Direct Self Consumption	Wattmeter measurement (Self-Consumption mode)(Int16)	Watt	-3200	3200	
46	30047		Always	Active Power Reduction rate	%	0	100	

47	30048		Always	Active Power Reduction Reason		Reason	0	12
				0	Not reduction ()			
				1	Not reduction ()			
				2	Temperature (T).			
				3	Temperature (T).			
				4	Temperature (T).			
				5	Communications (C)			
				6	Grid FrequencyActive Power control (F)			
				7	Grid Voltage/Active Power control(V)			
				8	Reactive Priority and Output Current Limit(Q)			
				9	Configuration (A)			
				10	Connection Initial Ramp (R)			
				11	Self Consumption mode (S)			
12	Manufactured reserved (M)							
48	30049		Always	Reactive Power Reference type (Uint16)		Reason	0	6
				0	CosPhi Configuration			
				1	Qref Manual			
				2	CosPhi Manual			
				3	Qref Communications			
				4	CosPhi Communications			
				5	Qref QvsV			
6	CosPhi CosPhiVsP							
49	30050	26	Always	Daily energy value. (bits 63-32, Uint32)		KWh*100	0	0xFFFF
50	30051			Daily energy value. (bits 31-0, Uint32)				

51	30052	15	Direct Self Consumption	Self Consumption ratio	%	0	100
52	30053	6	always	Inverter Instantaneous Stop event		0	65534
53	30054			Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF
---	---			---	---	-	-
124	30125			Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF

Table 2: Register description of online address range 30001-30125 for 1Play TLM.

(*)This Max/Min values are only approximated values, useful for programmers who need to know the typical range of each register.

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Author: FJA

6. REGISTER MAP AND DESCRIPTION FOR 3PLAY (ABI1000 AND ABI1004)

6.1 REV.1

Start Address	MB Modicon Address	Display order	Show when	Description	Magnitude	Usual Min Value (*)	Usual Max Value (*)
0	30001	1	always	Actual Date. Year (Uint16).	Year	1900	2100
1	30002			Actual Date. Month of the Year.(Uint16).	Month	1	12
2	30003			Actual Date. Day of the month.(Uint16).	Day	1	31
3	30004			Actual Date. Hour of the day. (Uint16).	Hour	0	23
4	30005			Actual Date: Minute. (Uint16).	Minute	0	59
5	30006			Actual Date: Second. (Uint16).	Second	0	59
6	30007	48	always	Total Energy delivered by the unit. kW*h.(bits 31-16, Uint32).	kW*h	0	2^32-2
7	30008			Total Energy delivered by the unit. kW*h. (bits 15-0, Uint32).			
8	30009	49	always	Total hours of operation. hours. (bitshigh part of Uint32. Bits 31-16).	Hours	0	2^32-2
9	30010			Total hours of operation. hours. (low part of Uint32. Bits 15-0).			
10	30011	50	always	Total number of connections since launching. (high part of Uint32. Bits 31-16).	n/a	0	2^32-2
11	30012			Total number of connections since launching. (low part of Uint32. Bits 15-0).			
12	30013	42	always	Partial Energy delivered by the unit since user reset. kW*h. (high part of Uint32. Bits 31-16).	kW*h	0	2^32-2
13	30014			Partial Energy delivered by the unit since user reset. kW*h. (low part of Uint32. Bits 15-0).			

14	30015	43	always	Partial number of hours of operation. hours. (high part of Uint32. Bits 31-16).	hours	0	2^32-2	
15	30016			Partial number of hours of operation. hours. (low part of Uint32. Bits 15-0).				
16	30017	44	always	Partial number of connection since user reset. (high part of Uint32. Bits 31-16).	n/a	0	2^32-2	
17	30018			Partial number of connection since user reset. (low part of Uint32. Bits 15-0).				
18	30019	2	always	Instantaneous alarm code 1 bits .	Flag bits	0	0xFFFF	
19	30020	3	always	Instantaneous alarm code 2 bits .	Flag bits	0	0xFFFF	
20	30021	4	always	Instantaneous alarm code 3 bits .	Flag bits	0	0xFFFF	
21	30022	5	always	Instantaneous alarm code 4 bits .	Flag bits	0	0xFFFF	
22	30023	7	always	Warning code.(Uint16).	Flag bits	0	0xFFFF	
23	30024	51	always	Unit flags 1. To indicate any feature.	Flag bits	0	0xFFFF	
				f0				SD Firmware Update Request
				f1				RS485 Firmware Update Request
				f2				Unit doing Autotest
				f3				SD Firmware Update Unit State
				f4				RS485 Firmware Update Unit State
				f5				Unit doing test
				f6				
				f7				
				f8				
				f9				
				f10				
				f11				
f12								

				f13				
				f14				
				f15				
24	30025	52	always	Unit flags 2. To indicate any feature.		Flag bits	0	0xFFFF
				f0	FW update result bit 0			
				f1	FW update result bit 1			
				f2	FW update result bit 2			
				f3	FW update result bit 3			
				f4	updateDisplayFWinfo			
				f5				
				f6				
				f7				
				f8				
				f9				
				f10				
				f11				
				f12				
				f13				
f14								
f15								
25	30026	53	always	Unit flags 3. To indicate any feature.		Flag bits	0	0xFFFF
26	30027	8	always	Status Unit 1		States	0	2
				0	Not Ready to Connect			
				1	Waiting to Connect			
				2	Connected to the Grid			

27	30028	54	always	Status Unit 2		States	0xFFFF	0xFFFF
28	30029	55	always	Status Unit 3		States	0xFFFF	0xFFFF
29	30030	9	always	Output grid RMS current of phase 1 (Uint16)		Amps x 100	0	8000
30	30031	10	always	Output grid RMS current of phase 2 (Uint16)		Amps x 100	0	8000
31	30032	11	always	Output grid RMS current of phase 3 (Uint16)		Amps x 100	0	8000
32	30033	12	always	Grid RMS voltage of phase 1.(Uint16).		Voltios x 10	0	3200
33	30034	13	always	Grid RMS voltage of phase 2.(Uint16).		Voltios x 10	0	3200
34	30035	14	always	Grid RMS voltage of phase 3.(Uint16).		Voltios x 10	0	3200
35	30036	15	always	Grid frequency (Uint16)		Hz x 100	0	7000
36	30037	16	always	Output apparent power (Int16)		VA/10	0	10000
37	30038	17	always	Output active power (Int16).		Watt/10	-1000	10000
38	30039	20	always	Output reactive power (Int16).		VAr/10	-7000	10000
39	30040	21	always	Cosine of Phi. (Int16)		x1000	-1000	1000
40	30041	22	always	PV1 current (Int16).		Ampsx100	-100	4000
41	30042(**)	23	ABI1000	PV2 current (Int16).		Ampsx100	-100	4000
42	30043	24	always	PV1 voltage (Int16)		Vdc	0	1200
43	30044(**)	25	ABI1000	PV2 voltage (Int16)		Vdc	0	1200
44	30045(**)	26	ABI1000	PV power (Int16).		Wats/10	-100	7000
45	30046	27	always	PV1 power (Int16).		Wats/10	-100	7000
46	30047(**)	28	ABI1000	PV2 power (Int16).		Wats/10	-100	7000

47	30048	29	always	Isolation resistance of PV field (Uint16)	kOhm	0	65	
48	30049	18	Direct Self-Consum	Wattmeter measurement (Self-Consumption mode) (Int16)	Watt/10	-3200	3200	
49	30050	45	always	Active Power Reduction rate(Uint16)	%	0	100	
50	30051	46	always	Active Power Reduction Reason (Uint16)		Reason	0	12
				0	Not reduction ()			
				1	Not reduction ()			
				2	Not defined.			
				3	Not defined.			
				4	Not defined.			
				5	Communications (C)			
				6	Grid FrequencyActive Power control (F)			
				7	Grid Voltage/Active Power control(V)			
				8	Reactive Priority and Output Current Limit(Q)			
				9	Configuration (A)			
				10	Connection Initial Ramp (R)			
				11	Self Consumption mode (S)			
				12	Manufactured reserved (M)			
				13	Pac vs Vac algorithm			
				14	Phi cosine or tangent target			
15	Low VAC to reach nominal power							
51	30052	47	always	Reactive Power Reference type (Uint16)		Reason	0	6
				0	CosPhi Configuration			
				1	Qref Manual			
				2	CosPhi Manual			

				3	Qref Communications				
				4	CosPhi Communications				
				5	Qref QvsV				
				6	CosPhi CosPhiVsP				
52	30053	30	String kit on	Current of PV string 1(Int16)		Amps x 10	0	500	
53	30054	31		Current of PV string 2(Int16)		Amps x 10	0	500	
54	30055	32		Current of PV string 3(Int16)		Amps x 10	0	500	
55	30056	33		Current of PV string 4(Int16)		Amps x 10	0	500	
56	30057	34		Current of PV string 5(Int16))		Amps x 10	0	500	
57	30058	35		Current of PV string 6(Int16)		Amps x 10	0	500	
58	30059	36		Current of PV string 7(Int16)		Amps x 10	0	500	
59	30060	37		Current of PV string 8(Int16)		Amps x 10	0	500	
60	30061	38		Current of PV string 9(Int16)		Amps x 10	0	500	
61	30062	39		Current of PV string 10(Int16)		Amps x 10	0	500	
62	30063	40		Warning String kit code		Code	0	0xFFFF	
63	30064	41	always	Daily energy value. (bits 32-16, Uint32)		KWh*100	0	0xFFFF	
64	30065			Daily energy value. (bits 15-0, Uint32)					
65	30066	19	Direct Self-Consum	Self Consumption ratio		%	0	100	
66	30067	6	always	Inverter Instantaneous Stop event			0	65534	
67	30068			Reserved value (Uint16). Not implemented (0xFFFF)		Not defined	0xFFFF	0xFFFF	
---	---			---		---	-	-	
124	30125			Reserved value (Uint16). Not implemented (0xFFFF)		Not defined	0xFFFF	0xFFFF	

Table 3: Register description of online address range 30001-30125 for 3Play.

(*)This Max/Min values are only approximated values, useful for programmers who need to know the typical range of each register.

(**)Fields to mask for ABI1004:

Serial number for ABI1000 $X_1X_2X_3X_4 = 3X00\dots$ (AAA0000IAN01AE)

Serial number for ABI1004 $X_1X_2X_3X_4 = 3X01\dots$ (AAA0000IAN01AE)

Validation Date: 03/02/2014

Author: FJA

7. REGISTER MAP AND DESCRIPTION FOR 3PLAY 100TL AND 160TL (ABS1004)

7.1 ONLINE DATA REV.0

Start Address	MB Modicon Address	Display order	Show when	Description	Magnitude	Usual Min Value (*)	Usual Max Value (*)
0	30001	1	always	Actual Date. Year (Uint16).	Year	1900	2100
1	30002			Actual Date. Month of the Year.(Uint16).	Month	1	12
2	30003			Actual Date. Day of the month.(Uint16).	Day	1	31
3	30004			Actual Date. Hour of the day. (Uint16).	Hour	0	23
4	30005			Actual Date: Minute. (Uint16).	Minute	0	59
5	30006			Actual Date: Second. (Uint16).	Second	0	59
6	30007	6	always	Partial Energy delivered by the unit since user reset. (high part of Uint32. Bits 31-16).	kW*h	0	2^32-2
7	30008			Partial Energy delivered by the unit since user reset. (low part of Uint32. Bits 15-0).			
8	30009	7	always	Partial number of hours of operation. (high part of Uint32. Bits 31-16).	hours	0	2^32-2
9	30010			Partial number of hours of operation. (low part of Uint32. Bits 15-0).			
10	30011	8	always	Partial number of connection since user reset. (high part of Uint32. Bits 31-16).	n/a	0	2^32-2
11	30012			Partial number of connection since user reset. (low part of Uint32. Bits 15-0).			
12	30013	5	always	Daily energy value. (bits 32-16, Uint32)	KWh*100	0	2^32-2
13	30014			Daily energy value. (bits 15-0, Uint32)			

14	30015	12	always	Instantaneous alarm code 1 bits.	Flag bits	0	0xFFFF	
15	30016	13	always	Instantaneous alarm code 2 bits.	Flag bits	0	0xFFFF	
16	30017	14	always	Instantaneous alarm code 3 bits.	Flag bits	0	0xFFFF	
17	30018	15	always	Instantaneous alarm code 4 bits.	Flag bits	0	0xFFFF	
18	30019	10	always	Instantaneous stop event (Uint16).	Code	0	0xFFFF	
19	30020	11	always	Warning code (Uint16).	Flag bits	0	0xFFFF	
20	30021	9	always	Status Unit 1		States	0	2
				0	Not Ready to Connect			
				1	Waiting to Connect			
				2	Connected to the Grid			
21	30022	30	always	Output grid RMS current of phase 1 (Uint16)	Amps x 100	0	20000	
22	30023	31	always	Output grid RMS current of phase 2 (Uint16)	Amps x 100	0	20000	
23	30024	32	always	Output grid RMS current of phase 3 (Uint16)	Amps x 100	0	20000	
24	30025	27	always	Grid RMS voltage of phase 1. (Uint16).	Volts x 10	0	5000	
25	30026	28	always	Grid RMS voltage of phase 2. (Uint16).	Volts x 10	0	5000	
26	30027	29	always	Grid RMS voltage of phase 3. (Uint16).	Volts x 10	0	5000	
27	30028	33	always	Grid frequency (Uint16)	Hz x 100	0	7000	
28	30029	34	always	Output apparent power (Int16)	VA/10	0	15000	
29	30030	35	always	Output active power (Int16).	Watt/10	-1000	15000	
30	30031	36	always	Output reactive power (Int16).	VAr/10	-15000	15000	
31	30032	37	always	Cosine of Phi. (Int16)	x1000	-1000	1000	
32	30033	40	always	Input 1 current (Int16).	Ampsx100	-100	20000	
33	30034	41	always	Input 1 voltage (Uint16)	Vdc	0	1200	
34	30035	42	always	Input 1 power (Int16).	Wats/10	-1000	15000	
35	30036	43	always	Isolation resistance of PV field (Uint16)	kOhm	0	65000	
36	30037	38	Direct	Wattmeter measurement (Self-Consumption mode) (Int16)	Watt/10	-20000	20000	

			Self-Consum					
37	30038	39	Direct Self-Consum	Self Consumption ratio	%	0	100	
38	30039	44	String kit on	Current of PV string 2_1 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
39	30040	45		Current of PV string 4_3 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
40	30041	46		Current of PV string 6_5 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
41	30042	47		Current of PV string 8_7 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
42	30043	48		Current of PV string 10_9 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
43	30044	49		Current of PV string 12_11 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
44	30045	50		Current of PV string 14_13 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
45	30046	51		Current of PV string 16_15 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
46	30047	52		Current of PV string 18_17 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
47	30048	53		Current of PV string 20_19 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
48	30049	54		Current of PV string 22_21 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
49	30050	55		Current of PV string 24_23 (Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255	
50	30051	20			Warning String kit code1.	Code	0	0xFFFF
51	30052	21			Warning String kit code2.	Code	0	0xFFFF
52	30053	24	always	Active Power Reduction rate(Uint16)	%	0	100	
53	30054	25	always	Active Power Reduction Reason (Uint16)		Reason	0	12
				0	Not reduction ()			
				1	Not reduction ()			
				2	Not defined.			
				3	Not defined.			
				4	Not defined.			
				5	Communications (C)			
6	Grid FrequencyActive Power control (F)							

				7	Grid Voltage/Active Power control(V)				
				8	Reactive Priority and Output Current Limit(Q)				
				9	Configuration (A)				
				10	Connection Initial Ramp (R)				
				11	Self Consumption mode (S)				
				12	Manufactured reserved (M)				
				13	Pac vs Vac algorithm				
				14	Phi cosine or tangent target				
				15	Low VAC to reach nominal power				
54	30055	26	always	Reactive Power Reference type (Uint16)		Reason	0	6	
				0	CosPhi Configuration				
				1	Qref Manual				
				2	CosPhi Manual				
				3	Qref Communications				
				4	CosPhi Communications				
				5	Qref (QvsV)				
				6	CosPhi (CosPhiVsP)				
55	30056	22	always	Unit flags 1. To indicate any feature.		Flag bits	0	0xFFFF	
				f0					
				f1					
				f2					
				f3					
				f4					
				f5					
				f6					

				f7				
				f8				
				f9				
				f10				
				f11				
				f12				
				f13				
				f14				
				f15				
56	30057	23	always	Unit flags 2. To indicate any feature.				
				f0	FW update result bit 0			
				f1	FW update result bit 1			
				f2	FW update result bit 2			
				f3	FW update result bit 3			
				f4				
				f5				
				f6				
				f7		Flag bits	0	0xFFFF
				f8				
				f9				
				f10				
				f11				
				f12				
				f13				
				f14				
				f15				

57	30058	2	always	Total Energy delivered by the unit. (bits 31-16, Uint32).	kW*h	0	2^32-2
58	30059			Total Energy delivered by the unit. (bits 15-0, Uint32).			
59	30060	3	always	Total hours of operation. (high part of Uint32. Bits 31-16).	Hours	0	2^32-2
60	30061			Total hours of operation. (low part of Uint32. Bits 15-0).			
61	30062	4	always	Total number of connections since launching. (high part of Uint32. Bits 31-16).	n/a	0	2^32-2
62	30063			Total number of connections since launching. (low part of Uint32. Bits 15-0).			
63	30064			Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF
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124	30125			Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF

Table 4: Register description of online address range 30001-30125 for 3Play 100TL.

(*)This Max/Min values are only approximated values, useful for programmers who need to know the typical range of each register.

7.2 STRING KIT DATA REV.0

String kit data are also available in registers 860-984 with different format. These values are available since FW version ABS1004_F.

Start Address	MB Modicon Address	Show when	Description	Magnitude	Usual Min Value (*)	Usual Max Value (*)
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860	30861	String kit on	Current of PV string 1 (Uint16)	A x10	0	0xFFFF
861	30862		Current of PV string 2 (Uint16)	A x10	0	0xFFFF
862	30863		Current of PV string 3 (Uint16)	A x10	0	0xFFFF
863	30864		Current of PV string 4 (Uint16)	A x10	0	0xFFFF
864	30865		Current of PV string 5 (Uint16)	A x10	0	0xFFFF
865	30866		Current of PV string 6 (Uint16)	A x10	0	0xFFFF
866	30867		Current of PV string 7 (Uint16)	A x10	0	0xFFFF
867	30868		Current of PV string 8 (Uint16)	A x10	0	0xFFFF
868	30869		Current of PV string 9 (Uint16)	A x10	0	0xFFFF
869	30870		Current of PV string 10 (Uint16)	A x10	0	0xFFFF
870	30871		Current of PV string 11 (Uint16)	A x10	0	0xFFFF
871	30872		Current of PV string 12 (Uint16)	A x10	0	0xFFFF
872	30873		Current of PV string 13 (Uint16)	A x10	0	0xFFFF
873	30874		Current of PV string 14 (Uint16)	A x10	0	0xFFFF
874	30875		Current of PV string 15 (Uint16)	A x10	0	0xFFFF
875	30876		Current of PV string 16 (Uint16)	A x10	0	0xFFFF
876	30877		Current of PV string 17 (Uint16)	A x10	0	0xFFFF
877	30878		Current of PV string 18 (Uint16)	A x10	0	0xFFFF
878	30879		Current of PV string 19 (Uint16)	A x10	0	0xFFFF
879	30880		Current of PV string 20 (Uint16)	A x10	0	0xFFFF
880	30881		Current of PV string 21 (Uint16)	A x10	0	0xFFFF
881	30882		Current of PV string 22 (Uint16)	A x10	0	0xFFFF
882	30883		Current of PV string 23 (Uint16)	A x10	0	0xFFFF
883	30884		Current of PV string 24 (Uint16)	A x10	0	0xFFFF
884	30885		Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF
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984	30985		Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF
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Table 5: Register description string kit currents address range 30861-30985 for 3Play 100TL.

(*)This Max/Min values are only approximated values, useful for programmers who need to know the typical range of each register.

8. REGISTER MAP AND DESCRIPTION FOR POWER B SERIES (ABK1000)

This mapping is valid since _R firmware version.

IMPORTANT: Ingeteam does not recommend polling rates higher than 2 requests per second.

8.1 REV.0

Start Address	Modbus Register	Description	Type	Scale	Magnitud	Min Value	Max Value
0	30001	Year	Uint16			1900	2100
1	30002	Month	Uint16			1	12
2	30003	Day	Uint16			1	31
3	30004	Hours	Uint16			0	23
4	30005	Minutes	Uint16			0	59
5	30006	Seconds	Uint16			0	59
6	30007	Output active power	Int16	10	kW	-25000	25000
7	30008	Output reactive power	Int16	10	kVar	-25000	25000
8	30009	Active Power rate	Int16	100	%	-10000	10000
9	30010	Reactive Power rate	Int16	100	%	-10000	10000
10	30011	Active Power rate reason	Enum			0	15
		1: Not reduction					
		2: High inverter temperature					
		3: External temperature control					
		4: Low temperature					
		5: Communications (C)					
		6: Grid frequency active power control (F)					
		7: Grid voltage (V)					
		8: Reactive priority and Output current limit (Q)					

		9: Configuration (A)					
		10: Connection Initial Ramp (R)					
		11: Grounding parallel system					
		13: Ventilation fans					
		14: High bus voltage					
		15: Communications watchdog					
11	30012	Reactive Power rate reason	Enum			0	9
		0: CosPhi configuration					
		1: Manual Reactive Power setpoint					
		2: Manual CosPhi setpoint					
		3: Communications Reactive Power Setpoint					
		4: Communications CosPhi Setpoint					
		5: Qac vs Vac algorithm					
		6: CosPhi vs Vac algorithm					
		7: Communications Watchdog Stop Reduction					
		8: Low vbus for Qac setpoint Reduction					
		9: Apparent Power Saturation					
12	30013	Pv Power	Int16	10	kW	-25000	25000
13	30014	Bus voltage	Int16		V	0	1600
14	30015	Pv current	Int16	10	A	-25000	25000
15	30016	Pv voltage	Int16		V	0	1600
16	30017	Heatsink R temperature	Int16	10	°C	0	1000
17	30018	Heatsink S temperature	Int16	10	°C	0	1000
18	30019	Heatsink T temperature	Int16	10	°C	0	1000
19	30020	Inductor temperature	Int16	10	°C	0	1500
20	30021	Power stack temperature	Int16	10	°C	-300	1000
21	30022	Ambient filtered temperature	Int16	10	°C	-500	700
22	30023	Maximun IGBT NTC Temperature	Int16	10	°C		
23	30024	Grid Voltage rms Phase R	Int16	10	V	0	5700

24	30025	Grid Voltage rms Phase S	Int16	10	V	0	5700
25	30026	Grid Voltage rms Phase T	Int16	10	V	0	5700
26	30027	Grid Current rms Phase R	Int16	10	A	-20000	20000
27	30028	Grid Current rms Phase S	Int16	10	A	-20000	20000
28	30029	Grid Current rms Phase T	Int16	10	A	-20000	20000
29	30030	Cosine of Phi	Int16	1000		-1000	1000
30	30031	Sign of Cosine of Phi	Int16			-1	1
31	30032	Output apparent power	Int16	10	kVA	-25000	25000
32	30033	Grid frequency	Int16	100	Hz	3000	7000
33	30034	Filter current rms Phase R	Int16	10	A	-1500	1500
34	30035	Filter current rms Phase S	Int16	10	A	-1500	1500
35	30036	VBUS Bus+ to earth	Int16		V	0	1600
36	30037	VBUS earth to bus-	Int16		V	0	1600
39	30040	Daily AC Energy Injected to grid	Uint32	100	kWh	0	2 ³² - 2
47	30048	Partial AC Energy injected to the grid since last reset	Uint32		kWh	0	2 ³² - 2
55	30056	Partial operating hours since last reset	Uint32		h	0	2 ³² - 2
57	30058	Partial number of connections since last reset	Uint32		times	0	2 ³² - 2
59	30060	Total AC Energy injected to the grid since launching	Uint32		kWh	0	2 ³² - 2
67	30068	Total operating hours since launching	Uint32		h	0	2 ³² - 2
69	30070	Total number of connections since launching	Uint32		times	0	2 ³² - 2
71	30072	Connection waiting time	Uint16		sec	0	9999
72	30073	Time left to connect	Uint16		sec	0	9999
73	30074	Instantaneous alarm code 1 bits	Uint16			0	0xFFFF
74	30075	Instantaneous alarm code 2 bits	Uint16			0	0xFFFF
75	30076	Instantaneous alarm code 3 bits	Uint16			0	0xFFFF
76	30077	Instantaneous alarm code 4 bits	Uint16			0	0xFFFF
77	30078	Instantaneous warning code	Uint16			0	0xFFFF
78	30079	Stop events	Enum			0	500
82	30083	Status Unit 1	Enum			0	2

		0: Not Ready to Connect					
		1: Waiting to connect					
		2: Connected to the Grid					
85	30086	Millisecond tick	Uint16		millisec	0	65534
86	30087	Hardware Power rate	Uint16	100	%	0	10000
87	30088	Operation mode	Enum			0	13
		1: PV_INVERTER					
		6: STORAGE					
		8: NIGHT_INJECT					
		9: STORAGE_GRID_FORMING					
		10: PV_GRID_FORMING					
		13: AUX_SERVICES_FEEDER					
88	30089	General state	Enum			0	6
		0: INITIAL					
		1: OPENING_DC_SWITCH					
		2: CLOSING_DC_SWITCH					
		3: AC_CONNECTING					
		4: CAN_CHECKING					
		5: CONNECTED					
		6: DISCONNECTING					
89	30090	Grid connection state	Enum			0	10
		0: DISCONNECTING					
		1: DISCONNECTED					
		2: CONNECT_TEST					
		3:BUS_PRECHARGING					
		4: GRID_GENERATING					
		5: GRID_GENERATING_WAITING					
		6: GRID_CONNECTING					
		7: GRID_CONNECTED					

		8: STANDBY					
		9: STANDBY_WAITING					
		10: GRID_SYNCH_DROOP					
90	30091	DC side state	Enum			0	7
		0: INITIAL					
		1: OPENED					
		2: CLOSING_CHECK					
		3: BATT_SYNC					
		4: BUS_PRECHARGING					
		5 :CLOSING					
		6: CLOSED					
		7: OPENING					
91	30092	Multi-inverter communication state (for PV ground only)	Enum			0	6
		0: INITIAL					
		4: WAITING					
		5: STARTING					
		6: CONNECTED					
94	30095	GND BOARD Average Current	Int16	0.1	mA	-11000	11000
97	30098	Address of out of limit holding register	Uint16			0	32767

(*)This Max/Min values are only approximated values, useful for programmers who need to know the typical range of each register.

9. ALARMS, STOP EVENTS AND WARNINGS

Alarms, Stop Event and Warnings are described in AAA0030IMB07 document.