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Ingeteam

R&D STANDARDS

FEASIBILITY AND USER REQUIREMENTS DOCUMENTS
FUNCTIONALITY SPECIFICATIONS
AAA0030IMB02_G

ONLINE DATA INPUT REGISTER LIST

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Date:	13/11/2012
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Approval Date:	22/08/17
File:	AAA0030IMB02_G

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

3.1 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

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

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

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

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

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

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

4.1 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

<table>
<tr><td>15</td><td>30016</td><td></td><td></td><td>Partial number of hours of operation. hours. (low part of Uint32. Bits 15-0).</td><td></td><td></td><td></td></tr>
<tr><td>16</td><td>30017</td><td rowspan="2">32</td><td rowspan="2">Always</td><td>Partial number of connection since user reset. (high part of Uint32. Bits 31-16).</td><td rowspan="2">n/a</td><td rowspan="2">0</td><td rowspan="2">2^32-2</td></tr>
<tr><td>17</td><td>30018</td><td>Partial number of connection since user reset. (low part of Uint32. Bits 15-0).</td></tr>
<tr><td>18</td><td>30019</td><td>2</td><td>Always</td><td>Instantaneous alarm code 1.</td><td>Flag bits</td><td>0</td><td>0xFFFF</td></tr>
<tr><td>19</td><td>30020</td><td>3</td><td>Always</td><td>Instantaneous alarm code 2.</td><td>Flag bits</td><td>0</td><td>0xFFFF</td></tr>
<tr><td>20</td><td>30021</td><td>4</td><td>Always</td><td>Instantaneous alarm code 3.</td><td>Flag bits</td><td>0</td><td>0xFFFF</td></tr>
<tr><td>21</td><td>30022</td><td>5</td><td>Always</td><td>Instantaneous alarm code 4.</td><td>Flag bits</td><td>0</td><td>0xFFFF</td></tr>
<tr><td>22</td><td>30023</td><td>6</td><td>Always</td><td>Warning code.(Uint16).</td><td>Flag bits</td><td>0</td><td>0xFFFF</td></tr>
<tr><td>23</td><td>30024</td><td>33</td><td>Always</td><td>Unit flags 1. To indicate any feature.
<table>
<tr><td>f0</td><td>SD Firmware Update Request</td></tr>
<tr><td>f1</td><td>RS485 Firmware Update Request</td></tr>
<tr><td>f2</td><td>Unit doing Autotest</td></tr>
<tr><td>f3</td><td>SD Firmware Update Unit State</td></tr>
<tr><td>f4</td><td>RS485 Firmware Update Unit State</td></tr>
<tr><td>f5</td><td>Unit doing some test</td></tr>
<tr><td>f6</td><td></td></tr>
<tr><td>f7</td><td></td></tr>
<tr><td>f8</td><td></td></tr>
<tr><td>f9</td><td></td></tr>
<tr><td>f10</td><td></td></tr>
<tr><td>f11</td><td></td></tr>
<tr><td>f12</td><td></td></tr>
<tr><td>f13</td><td></td></tr>
<tr><td>f14</td><td></td></tr>
<tr><td>f15</td><td></td></tr>
</table></td><td>Flag bits</td><td>0</td><td>0xFFFF</td></tr>
</table>

24	30025	34	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: updateDisplayFWinfo f5: f6: f7: f8: f9: f10: f11: f12: f13: f14: f15:	Flag bits	0	0xFFFF
25	30026	35	Always	Unit flags 3. To indicate any feature.	Flag bits	0	0xFFFF
26	30027	7	Always	Status Unit 1 0: Not Ready to Connect 1: Waiting to Connect 2: Connected to the Grid	States	0	2
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 0 Not reduction ( ) 1 Not reduction ( )	Reason	0	12

				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) 0 CosPhi Configuration 1 Qref Manual 2 CosPhi Manual 3 Qref Communications 4 CosPhi Communications 5 Qref QvsV 6 CosPhi CosPhiVsP	Reason	0	6
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			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 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.

Validation Date: 03/02/2014

Author: FJA

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

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	47	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	48	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	49	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	41	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	42	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	43	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	6	always	Warning code.(Uint16).	Flag bits	0	0xFFFF
23	30024	50	always	Unit flags 1. To indicate any feature. 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	Flag bits	0	0xFFFF

				f13				
				f14				
				f15				
24	30025	51	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: updateDisplayFWinfo f5: f6: f7: f8: f9: f10: f11: f12: f13: f14: f15:	Flag bits	0	0xFFFF
25	30026	52	always	Unit flags 3. To indicate any feature.	Flag bits	0	0xFFFF
26	30027	7	always	Status Unit 1 0: Not Ready to Connect 1: Waiting to Connect 2: Connected to the Grid	States	0	2

27	30028	53	always	Status Unit 2	States	0xFFFF	0xFFFF
28	30029	54	always	Status Unit 3	States	0xFFFF	0xFFFF
29	30030	8	always	Output grid RMS current of phase 1 (Uint16)	Amps x 100	0	8000
30	30031	9	always	Output grid RMS current of phase 2 (Uint16)	Amps x 100	0	8000
31	30032	10	always	Output grid RMS current of phase 3 (Uint16)	Amps x 100	0	8000
32	30033	11	always	Grid RMS voltage of phase 1.(Uint16).	Voltios x 10	0	3200
33	30034	12	always	Grid RMS voltage of phase 2.(Uint16).	Voltios x 10	0	3200
34	30035	13	always	Grid RMS voltage of phase 3.(Uint16).	Voltios x 10	0	3200
35	30036	14	always	Grid frequency (Uint16)	Hz x 100	0	7000
36	30037	15	always	Output apparent power (Int16)	VA/10	0	10000
37	30038	16	always	Output active power (Int16).	Watt/10	-1000	10000
38	30039	19	always	Output reactive power (Int16).	VAr/10	-7000	10000
39	30040	20	always	Cosine of Phi. (Int16)	x1000	-1000	1000
40	30041	21	always	PV1 current (Int16).	Ampsx100	-100	4000
41	30042(**)	22	ABI1000	PV2 current (Int16).	Ampsx100	-100	4000
42	30043	23	always	PV1 voltage (Int16)	Vdc	0	1200
43	30044(**)	24	ABI1000	PV2 voltage (Int16)	Vdc	0	1200
44	30045(**)	25	ABI1000	PV power (Int16).	Wats/10	-100	7000
45	30046	26	always	PV1 power (Int16).	Wats/10	-100	7000
46	30047(**)	27	ABI1000	PV2 power (Int16).	Wats/10	-100	7000

<table>
<tr><td>47</td><td>30048</td><td>28</td><td>always</td><td>Isolation resistance of PV field (Uint16)</td><td>kOhm</td><td>0</td><td>65</td></tr>
<tr><td>48</td><td>30049</td><td>17</td><td>Direct
Self-Consum</td><td>Wattmeter measurement (Self-Consumption mode) (Int16)</td><td>Watt/10</td><td>-3200</td><td>3200</td></tr>
<tr><td>49</td><td>30050</td><td>44</td><td>always</td><td>Active Power Reduction rate(Uint16)</td><td>%</td><td>0</td><td>100</td></tr>
<tr><td>50</td><td>30051</td><td>45</td><td>always</td><td>Active Power Reduction Reason (Uint16)<table><tr><td>0</td><td>Not reduction ( )</td></tr><tr><td>1</td><td>Not reduction ( )</td></tr><tr><td>2</td><td>Not defined.</td></tr><tr><td>3</td><td>Not defined.</td></tr><tr><td>4</td><td>Not defined.</td></tr><tr><td>5</td><td>Communications (C)</td></tr><tr><td>6</td><td>Grid FrequencyActive Power control (F)</td></tr><tr><td>7</td><td>Grid Voltage/Active Power control(V)</td></tr><tr><td>8</td><td>Reactive Priority and Output Current Limit(Q)</td></tr><tr><td>9</td><td>Configuration (A)</td></tr><tr><td>10</td><td>Connection Initial Ramp (R)</td></tr><tr><td>11</td><td>Self Consumption mode (S)</td></tr><tr><td>12</td><td>Manufactured reserved (M)</td></tr></table></td><td>Reason</td><td>0</td><td>12</td></tr>
<tr><td>51</td><td>30052</td><td>46</td><td>always</td><td>Reactive Power Reference type (Uint16)<table><tr><td>0</td><td>CosPhi Configuration</td></tr><tr><td>1</td><td>Qref Manual</td></tr><tr><td>2</td><td>CosPhi Manual</td></tr><tr><td>3</td><td>Qref Communications</td></tr><tr><td>4</td><td>CosPhi Communications</td></tr><tr><td>5</td><td>Qref QvsV</td></tr></table></td><td>Reason</td><td>0</td><td>6</td></tr>
</table>

				6 CosPhi CosPhiVsP			
52	30053	29	String kit on	Current of PV string 1(Int16)	Amps x 10	0	500
53	30054	30		Current of PV string 2(Int16)	Amps x 10	0	500
54	30055	31		Current of PV string 3(Int16)	Amps x 10	0	500
55	30056	32		Current of PV string 4(Int16)	Amps x 10	0	500
56	30057	33		Current of PV string 5(Int16))	Amps x 10	0	500
57	30058	34		Current of PV string 6(Int16)	Amps x 10	0	500
58	30059	35		Current of PV string 7(Int16)	Amps x 10	0	500
59	30060	36		Current of PV string 8(Int16)	Amps x 10	0	500
60	30061	37		Current of PV string 9(Int16)	Amps x 10	0	500
61	30062	38		Current of PV string 10(Int16)	Amps x 10	0	500
62	30063	39		Warning String kit code	Code	0	0xFFFF
63	30064	40	always	Daily energy value. (bits 32-16, Uint32)	KWh*100	0	0xFFFF
64	30065			Daily energy value. (bits 15-0,Uint32)			
65	30066	18	Direct Self-Consum	Self Consumption ratio	%	0	100
66	30067			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… (AAA0000IAN01AE)

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

Validation Date: 03/02/2014

Author: FJA

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

6.1 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	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 0 Not Ready to Connect 1 Waiting to Connect 2 Connected to the Grid	States	0	2
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 (Unt16)	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_1 3(Unt16) (8bits,8bits)	A x10 – A x 10	0 - 0	255-255
45	30046	51		Current of PV string 16_1 5(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) 0 Not reduction ( ) 1 Not reduction ( ) 2 Not defined. 3 Not defined. 4 Not defined. 5 Communications (C) 6 Grid Frequency / Active Power control (F)	Reason	0	12

				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)			
54	30055	26	always	Reactive Power Reference type (Uint16) 0 CosPhi Configuration 1 Qref Manual 2 CosPhi Manual 3 Qref Communications 4 CosPhi Communications 5 Qref (QvsV) 6 CosPhi (CosPhiVsP)	Reason	0	6
55	30056	22	always	Unit flags 1. To indicate any feature. f0 f1 f2 f3 f4 f5 f6 f7 f8 f9	Flag bits	0	0xFFFF

				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 f8 f9 f10 f11 f12 f13 f14 f15	Flag bits	0	0xFFFF
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
---	---			---	---	-	-
124	30125			Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF

Table 4: 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.

7. REGISTER MAP AND DESCRIPTION FOR POWER BLOCK (ABK1000)

7.1 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	2	Always	Actual Date. Month of the Year.(Uint16).	Month	1	12
2	30003	3	Always	Actual Date. Day of the month.(Uint16).	Day	1	31
3	30004	4	Always	Actual Date. Hour of the day. (Uint16).	Hour	0	23
4	30005	5	Always	Actual Date: Minute. (Uint16).	Minute	0	59
5	30006	6	Always	Actual Date: Second. (Uint16).	Second	0	59
6	30007	7	Always	Output active power (Int16).	kWatt x10	-12000	12000
7	30008	8	Always	Output reactive power (Int16).	kVAr x 10	-12000	12000
8	30009	76	Always	Active Power Reduction rate (Uint16)	% x 100	0	10000
9	30010	77	Always	Reactive Power Reduction rate (Int16)	% x 100	-10000	10000
10	30011	78	Always	Active Power Reduction Reason (Uint16) 0 Not reduction ( ) 1 Not reduction ( ) 2 Manufactured reserved 1 (M1) 3 Manufactured reserved 2 (M2)	Reason	0	12

				4 Manufactured reserved 3 (M3) 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 Manufactured reserved 4 (M4) 12 Manufactured reserved 5 (M5)			
11	30012	79	Always	Reactive Power Reduction Reason (Uint16) 0 CosPhi Configuration 1 Qref Manual 2 CosPhi Manual 3 Qref Communications 4 CosPhi Communications 5 Qref QvsV 6 CosPhi CosPhiVsP	Reason	0	6
12	30013	9	Always	PV power (Int16).	kWatt x 10	-12500	12500
13	30014	10	Always	BUS voltage (Int16)	Voltios	0	1200
14	30015	11	Always	PV current (Int16).	Ampsx10	-22000	22000
15	30016	12	Always	PV voltage (Int16)	Voltios	0	1200
16	30017	28	Always	HeatSink R Temperature (Int16)	ºCx10	-300	2000
17	30018	29	Always	HeatSink S Temperature (Int16)	ºCx10	-300	2000
18	30019	30	Always	HeatSink T Temperature (Int16)	ºCx10	-300	2000
19	30020	31	Always	Coil Temperature (Int16)	ºCx10	-300	2000

20	30021	32	Always	Stack Amb. Temperature (Int16)	ºCx10	-300	2000
21	30022	33	Always	Ambient. Temperature (Int16)	ºCx10	-300	2000
22	30023	34	Always	Reserved Temperature (Int16)	ºCx10	-300	2000
23	30024	13	Always	Grid RMS voltage of phase 1.(Int16).	Voltios x 10	-3400	3400
24	30025	14	Always	Grid RMS voltage of phase 2.(Int16).	Voltios x 10	-3400	3400
25	30026	15	Always	Grid RMS voltage of phase 3.(Int16).	Voltios x 10	-3400	3400
26	30027	16	Always	Output grid RMS current of phase 1 (Int16)	Amps x 10	-15500	15500
27	30028	17	Always	Output grid RMS current of phase 2 (Int16)	Amps x 10	-15500	15500
28	30029	18	Always	Output grid RMS current of phase 3 (Int16)	Amps x 10	-15500	15500
29	30030	19	Always	Cosine of Phi. (Int16)	x1000	-1000	1000
30	30031	20	Always	Sign of Phi (Int16)	-1 or +1	-1	1
31	30032	21	Always	Output apparent power (Int16)	kVA x 10	0	12000
32	30033	22	Always	Grid frequency (Uint16)	Hz x 100	0	7000
33	30034	23	Always	Filter RMS Current Phase 1 (Int16)	Amps x 10	-2600	2600
34	30035	24	Always	Filter RMS Current Phase 2 (Int16)	Amps x 10	-2600	2600
35	30036	25	Always	BUS+ – EARTH voltage (Int16)	Voltios x 10	0	1200
36	30037	26	Always	EARTH – BUS- voltage (Int16)	Voltios x 10	0	1200
37	30038	27	Always	Isolation resistance of PV field (Int16)	kOhm	0	65
38	30039	43	Always	External Extra Measurement 1 (Int16)	(20mA)x1000	0	20000
39	30040	44	Always	Daily AC injected energy value Hi. (bits 32-16, Uint16)	KWh*100	0	2^32-2
40	30041	45	Always	Daily AC injected energy value LO. (bits 15-0,Uint16)			
41	30042	46	Always	Reserved (Daily AC consumed energy HI)	n/a	0xFFFF	0xFFFF
42	30043	47	Always	Reserved (Daily AC consumed energy LO)		0xFFFF	0xFFFF
43	30044	48	Always	Reserved (Daily DC injected energy HI)	n/a	0xFFFF	0xFFFF
44	30045	49	Always	Reserved (Daily DC injected energy LO)		0xFFFF	0xFFFF
45	30046	50	Always	Reserved (Daily DC consumed energy HI)	n/a	0xFFFF	0xFFFF

46	30047	51	Always	Reserved (Daily DC consumed energy LO)		0xFFFF	0xFFFF

47	30048	52	Always	Partial AC energy injected since user reset. kW*h. (high part of Uint32. Bits 31-16).	kW*h	0	2^32-2
48	30049	53	Always	Partial AC energy injected since user reset. kW*h. (low part of Uint32. Bits 15-0).			
49	30050	54	Always	Reserved (Partial AC consumed energy HI)	n/a	0xFFFF	0xFFFF
50	30051	55	Always	Reserved (Partial AC consumed energy LO)		0xFFFF	0xFFFF
51	30052	56	Always	Reserved (Partial DC injected energy HI)	n/a	0xFFFF	0xFFFF
52	30053	57	Always	Reserved (Partial DC injected energy LO)		0xFFFF	0xFFFF
53	30054	58	Always	Reserved (Partial DC consumed energy HI)	n/a	0xFFFF	0xFFFF
54	30055	59	Always	Reserved (Partial DC consumed energy LO)		0xFFFF	0xFFFF
55	30056	60	Always	Partial number of hours of operation. hours. (high part of Uint32. Bits 31-16).	hours	0	2^32-2
56	30057	61	Always	Partial number of hours of operation. hours. (low part of Uint32. Bits 15-0).			
57	30058	62	Always	Partial number of connection since user reset. (high part of Uint32. Bits 31-16).	n/a	0	2^32-2
58	30059	63	Always	Partial number of connection since user reset. (low part of Uint32. Bits 15-0).			
59	30060	64	Always	Total AC energy injected. kW*h.(bits 31-16, Uint32).	kW*h	0	2^32-2
60	30061	65	Always	Total AC energy injected. kW*h. (bits 15-0, Uint32).			
61	30062	66	Always	Reserved (Total AC consumed energy HI)	n/a	0xFFFF	0xFFFF
62	30063	67	Always	Reserved (Total AC consumed energy LO)		0xFFFF	0xFFFF
63	30064	68	Always	Reserved (Total DC injected energy HI)	n/a	0xFFFF	0xFFFF
64	30065	69	Always	Reserved (Total DC injected energy LO)		0xFFFF	0xFFFF
65	30066	70	Always	Reserved (Total DC consumed energy HI)	n/a	0xFFFF	0xFFFF
66	30067	71	Always	Reserved (Total DC consumed energy LO)		0xFFFF	0xFFFF
67	30068	72	Always	Total hours of operation. hours. (bitshigh part of Uint32. Bits 31-16).	Hours	0	2^32-2
68	30069	73	Always	Total hours of operation. hours. (low part of Uint32. Bits 15-0).			
69	30070	74	Always	Total number of connections since launching. (high part of Uint32. Bits 31-16).	n/a	0	2^32-2
70	30071	75	Always	Total number of connections since launching. (low part of Uint32. Bits 15-0).			

71	30072	35	Always	Connection waiting time (Uint16)	seconds	0	65534
72	30073	36	Always	Time left to connect (Uint16)	seconds	0	65534
73	30074	37	Always	Instantaneous alarm code 1 bits (Uint16).	Flag bits	0	0xFFFF
74	30075	38	Always	Instantaneous alarm code 2 bits (Uint16).	Flag bits	0	0xFFFF
75	30076	39	Always	Instantaneous alarm code 3 bits (Uint16).	Flag bits	0	0xFFFF
76	30077	40	Always	Instantaneous alarm code 4 bits (Uint16).	Flag bits	0	0xFFFF
77	30078	41	Always	Instantaneous warning code (Uint16).	Flag bits	0	0xFFFF

78	30079	42	Always	Stop events (Uint16).	n/a	0	500
79	30080	80		Unit flags 1. To indicate any feature. f0 Reserved f1 RS485 Firmware Update Request f2 Reserved f3 Reserved f4 RS485 Firmware Update Unit State f5 Reserved f6 dcswitchstatus f7 f8 f9 f10 f11 f12 f13 f14 f15	Flag bits	0	0xFFFF

<table>
<tr><td>80</td><td>30081</td><td>81</td><td></td><td>Unit flags 2. To indicate any feature.<table><tr><td>f0</td><td>FW update result bit 0</td></tr><tr><td>f1</td><td>FW update result bit 1</td></tr><tr><td>f2</td><td>FW update result bit 2</td></tr><tr><td>f3</td><td>FW update result bit 3</td></tr><tr><td>f4</td><td>updateDisplayFWinfo</td></tr><tr><td>f5</td><td></td></tr><tr><td>f6</td><td></td></tr><tr><td>f7</td><td></td></tr><tr><td>f8</td><td></td></tr><tr><td>f9</td><td></td></tr><tr><td>f10</td><td></td></tr><tr><td>f11</td><td></td></tr><tr><td>f12</td><td></td></tr><tr><td>f13</td><td></td></tr><tr><td>f14</td><td></td></tr><tr><td>f15</td><td></td></tr></table></td><td>Flag bits</td><td>0</td><td>0xFFFF</td></tr>
<tr><td>81</td><td>30082</td><td>82</td><td></td><td>Unit flags 3. To indicate any feature.</td><td>Flag bits</td><td>0</td><td>0xFFFF</td></tr>
<tr><td>82</td><td>30083</td><td>83</td><td></td><td>Status Unit 1<table><tr><td>0</td><td>Not Ready to Connect</td></tr><tr><td>1</td><td>Waiting to Connect</td></tr><tr><td>2</td><td>Connected to the Grid</td></tr></table></td><td>States</td><td>0</td><td>2</td></tr>
</table>

83	30084	84		Status Unit 2 1 SU2_LEDS_MANUAL_ON 2 SU2_CAN_COMM_INIT 3 SU2_CAN_COMM_PRECLOSE 4 SU2_CAN_COMM_CLOSING 5 SU2_CAN_COMM_CLOSED 6 SU2_CAN_COMM_WAITING 7 SU2_CAN_COMM_STARTING 8 SU2_CAN_COMM_CONNECTED 9 10	States	0	0xFFFF
84	30085	85		Status Unit 3	States	0	0xFFFF
85	30086	86		Millisecond tick (Uint16)	milliseconds	0	65534
86	30087	87		Cyclic redundancy check (Uint16)	n/a	0x5A5A	0x5A5A
87	30088	88	Always	Grounding kit alarm (Uint16)	n/a	0	0xFFFF
88	30089	89	Always	Grounding kit status (Uint16)	milliamperes	-32767	32767
89	30090	90	Always	Average current (Int16)	milliamperes	-32767	32767
90	30091	91	Always	Rms current (Unt16)	miliamperes	0	65535
91	30092	92	Always	Com errors (Uint16)	miliamperes		
87	30088	88		Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF
---	---			---	---	-	-
124	30125			Reserved value (Uint16). Not implemented (0xFFFF)	Not defined	0xFFFF	0xFFFF

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

7.1.1 Changes from document version _B to _C

The following registers are changed:

- 30056: active power reduction rate is now expressed as %*100, that is, its values now range from 0 to 10000.
- 30057: power reduction reasons' texts are changed.
- 30058: reactive power reduction rate is now expressed as %*100, that is, its values now range from 0 to 10000.

7.1.2 Changes from document version _C to _D

Two new registers are added in addresses 45 (30046) and 46 (30047).

45	30046	BUS+ – EARTH voltage (Int16)	Vpbus	0	1200
46	30047	EARTH – BUS- voltage (Int16)	Vnbus	0	1200

As a consequence, all of the registers placed below these change their address number (new address = former address + 2).

7.1.3 Changes from document version _D to _E

Map reconfigured. To check changes, open excel file included in ZIP

8. ALARMS, STOP EVENTS AND WARNINGS

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