ATA004A Smart Battery Data Reader / Logger

Operating Instructions



The ATA004A is a diagnostic tool which can be used to view the data fields stored by Inspired Energy smart battery packs. It uses a standard USB port, with software written by Inspired Energy, to display the battery data on any personal computer. The unit can be used to view and record static battery data, or to log dynamic battery data while the battery is charging or discharging. This makes it an invaluable tool for quality assessments, system testing, SMBus communications troubleshooting and battery data fields which support external input.

What's in the box?



The ATA004 consists of: •A "Y" cable with 3 connectors •A CD containing the software

Getting Started:

- 1. Insert the CD into the drive on your PC
 - a. If installation does not automatically begin, navigate to the root directory on the CD & click on "Setup.exe"
- 2. If you wish to load the software in the recommended directories click "Next" or browse to the directories into which you wish to save the software.

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3. Accept the license agreements; one from Inspired Energy & one from National Instruments, and click "Next".



4. Click "Next" to begin the installation process & then Finish" to complete the installation.

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Start Installation Review the following summary before continuing	INFREDENERGY	Installation Complete	USFULD ENLI
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5. The ATA004A software will be listed in your Start Menu alongside the light bulb icon:

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The Battery Data Screen:

- The battery data is displayed in boxes in the center of the window.
 - A full description and derivation of each data field can be found in the Smart Battery Data Specification rev.1.1. Please contact Inspired Energy or visit www.sbs-forum.org/specs/ for a copy.
- Clicking on the logo at the top of the page will take you to www.inspiredenergy.com.
- Along the bottom are the status indicators for the USB connection, data scanning and battery status codes.
- On the left of the window are the scanning buttons and the quick health check status indicators.

12/17/2012 10:0	00:59 AM			INSPIE	RED ENERGY*
Scanning Bi	uttons			SOLUTIONS	FOR PORTABLE POWER
Keep Scanning	Manufacturer Access	At Rate OK	Absolute State of Charge	Charging Voltage	Serial Number
C Refresh	Remaining Capacity Alarm	Temperature	Remaining Capacity	Battery Status	Manufacturer Name
Press to Start Logging	Remaining Time Alarm	Voltage	Full Charge Capacity	Cycle Count	Device Name
Log Count 0	Battery Mode	Current	Run Time To Empty	Design Capacity	Device Chemistry
Battery Health: Cycle Count	At Rate	Average Current	Average Time to Empty	Design Voltage	Negative Cell
Capacity:	At Rate Time To Full	Max Error	Average Time To Full	Specifications	2nd Cell
Age:	At Rate Time To Empty	Relative State of Charge	Charging Current	Manufacturer Date	3rd Cell
Cell Balance: Fuel Gauge:		Manufacturer Data]	4th Cell
OK	Curck Health Che	ek.			Battery Data Fields

Connecting to the ATA004:



- Plug the USB connector into an available USB port (1.0 or higher) in your computer. The Blue LED will illuminate indicating power from the USB
- Plug the male blade connector into the battery pack observing the polarity. A green LED will flash during data transmission to & from the battery.
 - The ATA004 is protected against reverse polarity insertion.

At this point the software can read the battery data, and the system can be used to assess the state of health of the battery.

• If you wish to view &/or log dynamic battery data during a charge or discharge, plug the female connector into a charger or into your battery-powered device. This will enable the battery to operate the device as if it were inserted.

Operating Instructions



Operating the ATA004A:

With the battery & USB	File Options Writ	e Win <u>d</u> ow <u>H</u> elp				
port connected, you can scan the battery manually by using the "Refresh" button.	12/17/2012 10:4	8:54 AM			INSPI	RED ENERGY* FOR PORTABLE POWER
	Keep Scanning	Manufacturer Access	At Rate OK	Absolute State of Charge	Charging Voltage	Serial Number
To scan the battery	K	0003	0001	83	16800	192
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chockbox	Start	Remaining Time Alarm	Voltage	Full Charge Capacity	Cycle Count	Device Name
CHECKDOX.	Logging	10	16456	5940	2	NL2024
(Cog Count	Battery Mode	Current	Run Time To Empty	Design Capacity	Device Chemistry
	, , , , , , , , , , , , , , , , , , ,	4080	89	Not Applicable	6600	LION
If you wish to save the \checkmark	Battery Health:	At Rate	Average Current	Average Time to Empty	Design Voltage	Negative Cell
accurated data aliely the	Cycle Count:	0	9	Not Applicable	14400	4088
scanned data, click the	Capacity:	At Rate Time To Full	Max Error	Average Time To Full	Specifications	2nd Cell
logging button. A screen		Not Applicable	10	2870	0010	4121
will prompt you to enter a	Age:	At Rate Time To Empty	Relative State of Charge	Charging Current	Manufacturer Date	3rd Cell
filename / location and	Cell Balance:	Not Applicable	92	4000	1/15/2004	4108
	Fuel Gauge:		Manufacturer Data			4th Cell
data logging will then	Recalibrate		03~5C~03~08~00~0F~F8	~10~19~10~0C~10~2B~10~	00	4139
begin with one full record						-
saved for every scan.		17.				•
	USB Connected	Scan off	Scanning			Status OK
		Jocaron	Scanning J			

The Battery Health monitor provides a quick check on a battery's state of health. The bars will change from green through amber to red depending on the health of the battery. These are only a guide, and a red bar does not necessarily mean that the battery requires replacement. We recommend that you establish acceptable limits for your particular application, and always re-calibrate the battery before making any end of life determination. For example; you may decide to replace the battery only if two or more red bars are showing.

In the example shown above, the battery is a few years old & the fuel gauge requires calibration, but otherwise it is in good health & will continue to provide good service.

The "Options" Menu:

😑 AT.	A004A1.v		The Scan / Log Interval can be adjusted using this tab.
Eile	Options Set Sc	<u>W</u> rite Win <u>d</u> ow <u>H</u> elp an/Log Interval Ctrl+I	Entering a value in seconds will change the scanning / data logging rate accordingly
	Scar SME	Refresh Interval in Seconds Scan/Log Interval 5	
Scan ca function	an n as	ОК	be toggled on or off. This has the same the "Keep Scanning" checkbox.

The *SMBus Pullups* in the battery can be set low or high to suit the requirements of your device. Please note. The default is for the internal battery pullups to be ON. Changing them to off may cause communications difficulties.

Operating Instructions



Writing to the Battery:



in an orderly manner, & press the

can be used to check that the battery has accepted the new data.

Set Remaining Time Alarm to a value bet	ween 0 and 65535	time your users rea The default is set
Alarm Time in Minutes	0000 Read	Set Battery Mode to a value between 0 and
Close		Register in Hex
Set At Rate to a value between -32,768 an	d 32,768mA/mW	Close
At Rate in mA/10mW 4000 @ Write	0 Read	long will it take un for a discharge cur
Close		Note: if you have u

Manufacturer Access is used only internally by Inspired Energy.

0000
Read

The Remaining Capacity Alarm can be altered to suit the needs of your device. By default, all Inspired Energy products have this value set to 10% of the design capacity. Open this window & enter a value to a value that will enable your device to shutdown "write button. The "Read" button

Similarly the *Remaining Time Alarm* can be adjusted to suit the length of guire to save their work and shut down the device. to 10 minutes on all Inspired Energy products.

(<u>-</u>	1	
Register in Hex		
0		
Write		Read

The **Battery Mode** feature can be used to select the various operational modes for the battery; for example whether the battery capacity is reported in mAh or mWh etc.. The "AT-Rate" function allows you to ask the battery questions. Literally "If I were to charge / discharge the battery AT the following RATE, how

til the battery is full /empty?" Enter a negative integer rent and a positive integer for a charge current. used the battery Mode feature to change the capacity reporting from mAh to mWh you'll need to enter a value in mWh.

Using the ATA004A to Determine End of Life For A Battery:

The ATA004A can be used to check the state of health of a population of batteries. The following guidelines can be used to run a quick assessment of whether a battery should be returned to service or replaced. For example, it may be time to replace the battery if:

- Cycle Life: If the Cycle Life count has exceeded 355
- If this shows a date older than 4 years Manufacture Date:
- Full Charge Capacity: If this value is less than 65% of the Design Capacity

These are guidelines only. Each application is different and may have differing thresholds for battery replacement. To assist in your decisions the battery state of health monitor uses a "traffic light" system to monitor & communicate those battery parameters which are typically used in end of life determinations.

NOTE: The Max Error value should be below 5% before making any end of life determinations.

Thresholds used by the battery health monitor	Green	Amber	Red		
Cycle Count	<250	250 - 355	>355		
Full Charge Capacity	>80%	80% - 65%	<65%		
Age	<2yrs	2 - 4yrs	>4yrs		
Cell Balance (Max cell voltage deviation)	<60mV	n/a	>60mV		
The "Fuel Gauge" box changes from "OK" to "Recalibrate" when Max Error >= 10%					

The ATA004A is for use with Inspired Energy products only.