

INTERACTIVE 2000™ BATTERY SYSTEM

DIONIC® 90
lithium ion
Digital Battery

OWNER'S MANUAL



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IMPORTANT
READ AND UNDERSTAND THIS MANUAL
BEFORE OPERATION

The InterActive 2000 Dionic 90 battery lithium ion chemistry delivers a higher, power to weight ratio than NiCd & NiMH. However, all lithium ion batteries have more sensitive charging and discharging parameters and require longer charge times (2-4 hours). See **charging section page 5 for more details.**

The Dionic 90 battery will ONLY charge on one of the following chargers:

- Any InterActive 2000 PowerCharger (software rev 3.6 or higher)
- Titan Twin (Two Tone Only).
- Titan T2
- Titan 70 (models with S# 1032 and lower may need to be upgraded at factory)

THE DIONIC 90 BATTERY CANNOT BE CHARGED ON Anton/Bauer PowerCharger XM2004 OR XM2002 charge modules.

DO NOT attempt to charge on any charger that is not listed above.

Special safety circuits in the DIONIC 90 battery will prevent charging on ANY charger, which cannot properly address the battery communication.

This DIONIC 90 battery, because of its lithium ion chemistry, is unlike other video batteries you may have used. Special precautions and handling instructions are contained in this manual and should be strictly adhered to for safe and reliable operation. **Contact Anton/Bauer Customer Support at (203) 929-1100 with any questions regarding this product.**

INTRODUCTION

The development of this new DIONIC 90 battery system has been made possible through the incorporation of the pioneering InterActive technology of the Anton/Bauer Digital system with the very latest lithium ion cell formulations. Each DIONIC 90 battery features an on-board “fuel computer” to monitor energy put into and taken out of the battery, as well as critical operating characteristics and conditions. This data is communicated to the InterActive charger to optimize safe and reliable performance.

In addition, remaining battery capacity information is available to the operator by means of a RealTime LCD display on each battery and in the viewfinder of the most popular broadcast and professional camcorders. The patented interface from the Digital battery to the camera viewfinder is factory standard equipment on most camera/camcorder models from the leading camera manufacturers.

Anton/Bauer InterActive 2000 chargers were designed in anticipation of new cell technologies, so chargers in the field require only a single chip update to effectively address this new battery system, as well as the standard ProPac, HyTron, ProFormer and TrimPac battery products. This upward and downward compatibility uniquely allows Anton/Bauer to introduce new high performance cell technologies, such as DIONIC 90, safely and seamlessly into existing battery inventories.

The new DIONIC 90 battery will automatically identify itself to the InterActive 2000 charger, activating the specialized charge routines necessary to effectively utilize this new technology.

FEATURES

1. **Microprocessor Fuel Computer** - Accurately monitors the energy in the battery with programs that take into account battery age, self discharge, charge/discharge rate, operating conditions and previously experienced charge/discharge cycles. The DIONIC 90 battery constantly “learns” its precise state of charge and remaining capacity. This data is automatically transmitted to an InterActive charger.
2. **Integral RealTime ‘LCD’** – This new and exclusive Anton/Bauer feature displays both the remaining runtime and the percentage of remaining battery capacity at all times - *simultaneously*. No special adapters or set up is required. (see complete explanation page 7-8)
3. **Viewfinder Fuel Gauge Display** - Cameras which include the Anton/Bauer InterActive viewfinder feature connect with the DIONIC 90 battery “Fuel Computer” to display an accurate “Fuel Gauge” of remaining battery capacity in the viewfinder. Reference your camera/camcorders owner’s manual for proper menu settings.
4. **Impac® Case design** - High impact case construction protects the cells from impact that would damage or destroy conventional batteries.
5. **Gold Mount® Interface** - Patented worldwide standard Gold Mount connector is compatible with all Anton/Bauer camera mounts and accessories.
6. **Individual Computer Testing** – As with all Anton/Bauer batteries, each and every InterActive 2000 DIONIC 90 battery is individually tested to assure optimum capacity, voltage and overall quality. A serialized computer performance graph as confirmation of this testing is enclosed.

CHARGING DIONIC 90 BATTERIES

- DO NOT ATTEMPT TO CHARGE THIS BATTERY WITH ANY CHARGER OTHER THAN THE ANTON/BAUER InterActive 2000 CHARGERS SPECIFIED IN THIS MANUAL.

- **Allow the battery to reach a steady green (LifeSaver) mode before using for the first time. Please read the individual charger Owner's Manual to become acquainted with the many unique operating features of the chargers.**

- The DIONIC 90 battery will be approximately 90% charged when the LED's on the charger indicate FLASHING GREEN. The battery is 100% charged when the charger indicates STEADY GREEN. The Dionic 90 battery may be removed from the charger and discharged in either condition.

- **The Dionic 90 battery can remain on the charger until just prior to being used.** The LifeSaver (STEADY GREEN charger LED indication) maintenance routine keeps the battery charged and ready for use. If the battery will not be used for an extended period (more than 60 days) see "Operating Guidelines" on page 11.

For best results this battery should be used or returned to the InterActive 2000 charger within 48 hours of being removed from the charger.

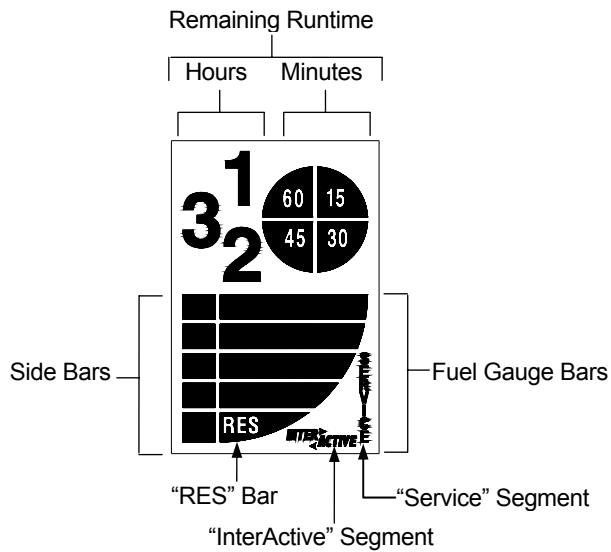
NOMINAL CHARGE TIMES FOR DIONIC 90

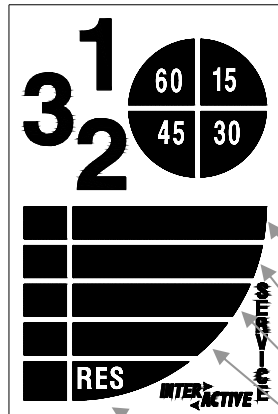
Charge Level LED Indicators	90% Flashing Green	100% Steady Green
Dual 2722 (2 batteries simultaneously)	2hrs.	3hrs.
InterActive 2000 PowerCharger (Quad/Dual – 2702/2701/2700) (Quad/Dual – 2401/2400)	2 hrs.	3 hrs.
Titan T2 (2 batteries simultaneously)	2hrs.	3hrs.
Titan 70	2hrs.	3hrs.
Titan Twin (2 batteries simultaneously)	4hrs.	5hrs.
Titan TWQ (4 batteries simultaneously)	4hrs.	5hrs.

Charge time can vary depending on age, condition and remaining capacity of each battery at the time it is placed on the charger.

The DIONIC 90 features an all NEW “RealTime” LCD display providing on-the-fly remaining run time estimates in 15 minute increments as well as *simultaneously* providing remaining capacity information using the traditional “Fuel Gauge” approach. No special adapters or set up is required. RealTime *automatically calculates the load and displays capacity information and battery status at all times.*

Special electronics protect the lithium ion cells in the DIONIC 90 battery from damage and to ensure safe operation. These electronics work in conjunction with the Digital Battery electronics and will give the operator additional indications in the RealTime display of the battery’s status as outlined below.





-The large numbers **1, 2 or 3** indicate remaining hours under current load (only one number will display at any one time)

-The pie chart numbers (**15, 30, 45, or 60**) indicate remaining minutes under current load.

-The InterActive Segment indicates a **FULLY CHARGED** battery verified by charger communication

-Top BAR: Indicates 75%-96%

- 2nd BAR: Indicates 50% - 75%

- 3Rd BAR: Indicates 25% - 50%

- 4th BAR: Indicates 7% - 25%

- INTERACTIVE 96 - 100%

-RES BAR: Indicates 0 - 6%

1. **“INTERACTIVE” SEGMENT:** When illuminated, it indicates the DIONIC 90 battery has completed its full charge routine.
2. **“RES” Bar:** Is the last “Fuel Gauge” Bar and will start to flash at 6% capacity and will continue to flash until EOD is reached.
3. **“SERVICE” SEGMENT:** Indicates self-diagnostic functions have detected anomalies. A battery with a “Service” flag should be returned to the Anton/Bauer Service Department.
4. **“SIDE BAR” SEGMENTS:** Will remain ON unless a calibration charging routine is required.

If the SIDE BARS (only) flash, AND other icons are lit and not flashing, this indicates the battery has requested to be fully charged and discharged in order to update its “learned capacity”. This “learning” or “calibration” should typically occur during normal equipment operation. However, if the battery has not been fully charged and discharged for some time, this indication will appear.

To remove the flashing SIDE BARS, fully charge the battery (STEADY GREEN indication) on the InterActive 2000 charger. Then either:

- (a) Discharge the battery on a camera in normal operation continuing to keep the camera “hot” until it shuts down. Then return the battery to the charger. When the battery is full remove it from the charger.
- (b) This can be done automatically with an InterActive2000 PowerCharger with a DDM (Diagnostic Discharge Module installed. This unique feature is called “AUTOCAL” and is included as standard on QUAD 2702 and DUAL 2722 PowerChargers. (Please reference the appropriate PowerCharger Owner’s Manual.)

IMPORTANT NOTE: The flashing SIDE BARS indication is not a warning indication. The battery will operate perfectly normal while awaiting a “learning” cycle. Rather than relying on an “assumed” capacity, as with some imitation fuel gauges, the DIONIC 90 battery relies on the Digital Battery electronics to update capacity information as the battery sees different operating conditions and ages normally. The flashing bars are merely an indication that the battery has not updated this information for some time and is requesting a confirmation of its “learned” capacity.

RealTime Display Indications

- When the DIONIC battery is being charged remaining runtime is not displayed.
- Remaining run time is calculated using the present available battery capacity and a constantly updated accurate measurement of the present load on the battery.
- If no load is detected, or if the battery is removed from the charger before any discharge load is applied, the default assumed power for remaining run time calculations is 20 Watts.
- When the battery determines that a load is attached, remaining run time will be calculated based on that load and the time remaining will be updated.
- The battery will “learn” this new load and retain that load information in non-volatile memory. If the battery is removed from the camera it will retain this information for 30 minutes or until it is returned to the charger or sees a new load. After 30 minutes the battery will return to the default load of 20 watts.
- **OVERCURRENT INDICATION** If the DIONIC 90 battery is subjected to a load that exceeds specifications, the protection electronics will operate to protect the lithium ion cells. **All status icons on the LCD will flash at a once per second rate.** This can occur, for example, if a cold halogen light =>75 watts is turned on. When the over-load condition is removed, the display will return to normal.

- When the battery is completely discharged the LCD will flash the 15 minute icon and the 'RES' bar until the battery is returned to a charger.
- If the protection electronics detect a low battery voltage condition (any one cell reaches roughly 2.5Vdc or approximately 10V battery voltage), the LCD sidebars will flash until the battery is returned to a charger. If the battery is not returned to the charger, after a time the Fuel Gauge will be turned off and the LCD will go completely blank until the battery is returned to a charger.

<u>LCD ICON's</u>	<u>Indication</u>	<u>Action</u>
- Side Bar blinking - Any others on normally	Calibrate	Full Discharge, then Charge
- Side Bar blinking - Any others lit and blinking	Over Current	Remove Excess Load
- Side Bar lit, but NOT blinking - All others off	Under Voltage	Return to Charger
- Display blank	Under Voltage	Return to Charger

OPERATING GUIDELINES

1. **Keep batteries cool or at room temperatures whenever possible.** Sustained elevated temperatures are the primary reason for premature failure of lithium ion batteries:
 - a. Charging - Charge batteries at room temperature. In warm climates keep chargers in air conditioned rooms for best performance.
 - b. On assignment - Do not leave batteries in a hot vehicle trunk or out in direct sunlight.
 - c. Although lithium ion has good self-discharge characteristics, long term storage in a fully charged condition will result in irreversible capacity loss. This is a problem for all lithium ion batteries – from cell phones to video cameras. Use the battery; do not store it for extended periods.
 - d. Batteries should always be stored in a partially charged state and kept cool. If batteries must be stored for a long period (over six months), they should be periodically removed from storage and submitted to a discharge/charge cycle.

2. **Do not over-discharge batteries** - It is quite proper to discharge a battery until a low voltage warning in the camera or VTR is observed. However, a switch to a fresh battery should occur as soon as possible following such indication. Never leave a battery operated device unattended while it is running.

3. **DO NOT LEAVE A BATTERY ATTACHED TO A CAMERA/CAMCORDER during transit or storage.** “Keep warm” circuitry in the camera can drain the battery, because the DIONIC 90 battery has specialized circuits which will not allow a battery to over discharge, the battery will protect itself and shut down.

4. Low voltage batteries can also be caused by allowing batteries to remain off the charger for extended periods causing the LCD display to be blank, indicating that the electronic circuitry has removed all load from the battery cells – including the display. In the case that the battery is in a low voltage condition the battery should be returned to the charger. The charge routine will not be initiated by the charger until all other batteries have completed their fast charge routines. Therefore, a low voltage battery can be installed on an InterActive charger without the charger indicating recognition. The battery should remain on the charger until charging is complete. It may be helpful to remove other batteries before placing a battery with a blank display on the charger.
5. Never leave any battery unattended on equipment.
6. Routine use of a battery at discharge rates greater than the battery rating (e.g. 90 watts maximum, <50 watts for lighting load) can reduce overall service life. Always select the proper size battery for your application.
7. Discharging the battery for diagnostic purposes should only be performed on an occasional basis (once every 6-8 weeks at most). Unnecessary discharging only detracts from overall life.
8. Periodic cleaning of both the charger terminals and battery terminals will ensure continued reliable operation. Clean the terminals occasionally with a pencil eraser or lightly scrape the surface with a blunt instrument to help reduce this possibility.

Anton/Bauer publishes a comprehensive “Video Battery Handbook” to help you further understand the care and use of video batteries. This guide is available at no charge by contacting Anton/Bauer at 1-800-422-3473 or 203-929-1100 or fax 203-929-9935. It can also be downloaded from the web at www.antonbauer.com.

SERVICE

In the event a DIONIC 90 battery fails to deliver acceptable performance, it must be returned to the Anton/Bauer. No other facility is qualified and equipped to service the InterActive 2000 DIONIC 90 batteries and calibrate the electronic components and sensors. Any attempt by the user or any other unauthorized persons to service this battery will surely result in improper calibration of the electronic components resulting in severe battery damage and/or safety hazards, including potential personal injury and/or damage to property. Any such attempt will void any/all warranties.

- WARNING -

1. **NEVER** attempt to service this battery. If there is a problem, send this battery only to Anton/Bauer for evaluation.
2. **NEVER ATTEMPT TO OPEN THIS BATTERY.** The electronic circuits inside the battery can be damaged causing malfunction and/or potential hazard to person and property.
3. **NEVER** attempt to replace the cells in this battery – it cannot be rebuilt or serviced. At the end of its useful life contact the Anton/Bauer Customer Support Group.

PRECAUTIONS

1. **Do not expose this battery to high temperatures (above 50°C/120°F). This includes storage in direct sunlight, in cars in hot weather, or in close proximity to heating devices. This may cause electrolyte leakage, impaired performance and shortening of battery service life.**
2. **When not using the battery for prolonged periods, the DIONIC 90 battery should be charged to approximately 50% capacity and removed from the charger. Long term storage in the full charge state will result in deterioration of capacity, which is unrecoverable in subsequent use.**
3. **ALL LITHIUM ION BATTERIES have a finite life. If the battery exhibits noticeably shortened run time the battery should be replaced immediately. Shortened runtime is indicative of at least one cell, which has reached end of life. UNDER NO CIRCUMSTANCES attempt to “recondition” this battery by repeated charging and discharging.**
4. **This battery contains specialized electronic circuits, which are designed to protect the lithium ion cells from overcharge, overdischarge and overcurrent. Redundant protection devices are designed to operate if the battery voltage is abnormally high or low and if the temperature of the battery exceeds operating specifications. These electronic devices can be damaged if the battery is subject to abuse or damage. Do not use a battery that has been subjected to excessive mechanical shock or water damage.**
5. **Do not drop, puncture or crush this battery. Do not use the battery if the case is damaged or broken. Do not open or attempt to service this battery if damaged.**

DIONIC 90 BATTERY SPECIFICATIONS

OUTPUT VOLTAGE	14.4v Nominal 12.4 ~ 16.8v Operating
CAPACITY (CELL CAPACITY)	90 WH Nominal (6.3 AH Rated)
FUSE	Internal 8amp
RECOMMENDED OPERATION (MAXIMUM DISCHARGE RATE)	15 - 50 watts ¹ (90 watts) ²
TYPICAL RUN-TIME	@ 20w - 4 ½ hrs. @ 25w - 3 ½ hrs. @ 40w - 2 ¼ hrs.
WEIGHT	1.7 lbs
SIZE	5 ¼ x 3 ½ x 2 ⅛
CHARGE TEMPERATURE	0 – 40°C
DISCHARGE TEMPERATURE	-20 – 60°C
STORAGE TEMPERATURE	-20 – 50°C

¹ DIONIC 90 may be used to power both camera and on camera light however its maximum cold halogen lighting load is restricted to 50 watts.

² Routine use of a battery at discharge rates greater than the recommended operating range can reduce overall service life. Always select the proper size battery for your application.

WARRANTY - InterActive 2000 DIONIC 90 Battery

IMPORTANT: WARRANTY REGISTRATION CARD MUST BE MAILED WITHIN 10 DAYS OF PURCHASE TO QUALIFY FOR THIS WARRANTY. Proper registration will also enable us to send you important update information.

This new InterActive 2000 DIONIC 90 battery has been tested prior to shipment and is warranted against defects in materials and workmanship when this battery is used in conjunction with Anton/Bauer Logic Series InterActive 2000. chargers. If the battery is found to be defective or fails to meet minimum* capacity specifications, the following will apply:

DIONIC 90: 0-12 MONTHS – “Anton/Bauer will repair or replace the product at Anton/Bauer’s option - FREE OF CHARGE.”

WARRANTY REGISTRATION, INCLUDING SERIAL NUMBERS OF InterActive 2000 CHARGERS USED WITH THIS PRODUCT, MUST BE SUPPLIED TO ANTON/BAUER.

This warranty does not cover damage resulting from accident, misuse or abuse, neglect, improper service or maintenance. Use of unauthorized service, replacement parts or attachments will void this warranty. Misuse includes any use of this product in other than its intended applications.

No responsibility is assumed for any special, incidental or consequential damages. No other Warranty, written, oral or implied is assumed or authorized by Anton/Bauer. The liability of Anton/Bauer hereunder is expressly limited to a claim for a repair or replacement for the goods sold or as otherwise stated herein.

This Warranty is to be construed and enforced in accordance with the law of the State of Connecticut, including the provisions of the Uniform Commercial Code as adopted and from time to time amended in the State of Connecticut, and not the Convention for the International Sale of Goods. This choice of Connecticut law is exclusive of any Connecticut law that would require reliance on any law foreign to Connecticut. Should any action of law or in equity be brought by any person under this Warranty, such action shall be brought only in the United States District Court for the District of Connecticut, or in any Superior Court in Fairfield County, Connecticut, U.S.A.

*Performance is warranted at a minimum of 70% of rated capacity.

If you have any questions regarding applications or specifications, or to obtain warranty service on this or any Anton/Bauer product, contact the Anton/Bauer Customer Support Group. See back page for contact information.

TRANSPORTATION NOTICE

The DIONIC 90 lithium ion battery pack is suitable for air transport as a non-hazardous article under the regulations of the International Air Transport Association (IATA), the International Civil Aviation Organization (ICAO) and the United Nations (UN).

The DIONIC 90 lithium ion battery pack contains aggregate lithium equivalence in a quantity not exceeding 8 grams. This quantity is in compliance with section A45-2* of the Hazardous Substance Standards of the ICAO and IATA. The pack is thus suitable for air transport as a non-hazardous article.

***Section A45**

“Lithium cells and lithium batteries are not subject to these Instructions if they meet the following requirements:

- 2) For a liquid metal or lithium alloy battery with liquid cathodes, the aggregate lithium content is not more than 1g, for a lithium metal or lithium alloy battery with solid cathodes, the aggregate lithium content is not more than 2g, and for a lithium ion battery, the aggregate equivalent lithium content is not more than 8g.”

One or more of the following patents may apply:

4,810,204
4,822,296
4,965,738
5,057,383

Other patents, U.S. and International pending.

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The worldwide standard, Triconn, TrimPac, Ultralight, Ultrakit

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