

BX-212 Advance

Computerized Nicad Charging System

User's Manual

Thank you for purchasing the BX-212.

Misoperation of this equipment during rapid charging can be dangerous.

For safety's sake, read this manual thoroughly, and store it with the charger for future reference.

1. Notes on Usage

In this manual, warnings are classified into three levels as follows, depending on the severity of the danger posed by failure to observe the proper procedure in question.

Danger Failure to observe the matter discussed in such an item poses a serious threat of death or severe injury.

Warning Failure to observe the matter discussed in such an item poses a possibility of death or severe injury, and a large likelihood of damage to the equipment or property.

Caution Failure to observe the matter discussed in such an item poses a possibility of injury or damage to the equipment or property.

Danger

- If the charging current for this charger is set incorrectly, the batteries may be damaged or may leak. Always set the charging current in accordance with the instruction manual provided with the battery. If you are uncertain of the proper charging current, contact the dealer where you purchased the battery.
- When using a car battery as the power supply, place the charger at a distance from the car. If the charger is placed in the engine compartment or in the car itself, a short circuit could be dangerous.
- To prevent serious injury in the unlikely event of an accident, do not put your face near a battery that is being charged.
- Do not set up the charging equipment in such a way that it is within the reach of children.
- If a battery leaks during charging, do not let the liquid come into contact with your eyes. Blindness could result. If you do get the liquid in your eyes, flush your eyes with a large amount of water and then contact a doctor immediately.
- Do not store or transport this equipment together with batteries. Doing so creates a risk of creating a short circuit or starting a fire.
- When cleaning this charger, use a non-flammable cleaning solution. Disconnect the power supply and any batteries before cleaning the charger. Failure to do so could cause a fire.
- Sparking may occur when connecting or disconnecting the power supply or a battery. Remove any flammable or ignitable materials from the vicinity before connecting or disconnecting the power supply or a battery.

Warning

- Do not disassemble this unit.
- The only batteries that can be charged by this unit are nicad batteries with a normal delta peak and Kondo Hydropack batteries. Other types of batteries, such as dry cells, sealed batteries, nickel hydride batteries, and lithium ion batteries cannot be charged by this unit.
- The supply voltage for this unit is 10 to 24V DC. Use either a 10-amp or higher stabilized power supply that meets the ??? (and bears the mark), or a 35Ah or higher battery. Never connect this unit to a normal household (100V AC) power outlet.
- This unit may become hot even while charging a battery normally. If this unit is sitting on a plastic sheet while charging, the heat from the unit may melt the plastic. Place this unit on a nonflammable material during use.
- If the power cord is frayed or damaged, do not use this unit until the cord is replaced or repaired.
- The delta peak may be difficult to reach if the nicad batteries are new or have not been used for an extended period of time.

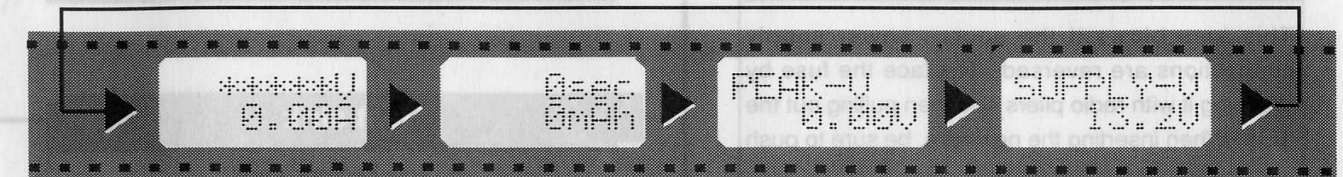
Caution

- Do not use this unit if it becomes wet. Send it in for repairs.
- Do not use the unit if a foreign object (especially a metallic object) is inserted through the slits on the side of this unit until such object is removed.
- After confirming that a battery has been charged completely, disconnect it from the charger. Do not discharge it.
- Be certain to use a 15A fuse. Other fuses will not provide the proper protection.
- Keep the charger out of direct sunlight and at a temperature of 5°C to 40°C while charging.
- Do not set up this unit near water or in a very humid location.
- Do not charge batteries while they are still warm after being discharged (used). Batteries can be charged once they have cooled to room temperature.
- Do not charge batteries for transmitters/receivers (even large-capacity batteries) at 1.8A or more. The leads on these batteries are thin, so they can become dangerously hot if they are forced to carry a large amount of current.
- Do not connect this charger to its source power supply while the battery to be charged is connected. Doing so can blow the fuse and place a load on the source power supply.
- Shorting the terminals on the source power supply with the output terminals while charging is in progress will damage the internal circuitry of the charger.

2. Explanation of LCD Screens

Pressing the Select button changes the display as shown below.

(The displays shown are those that appear when there is no nicad battery connected.)



Nicad voltage screen/
charging current
screen

Charging timer
screen/charging
capacity screen

Peak voltage screen

Main power supply
voltage screen

(Charging can be started by pressing the Start button, no matter which screen is displayed.)

2-1. Nicad Voltage/Charging Current Screen

Charging capacity safety timer cancellation indicator

This indicator does not normally appear. The charger's timer is programmed to halt charging when the charged capacity becomes constant. When charging a 5000 mAh nicad with eight or fewer cells, hold down both the Select button and the Start button when connecting the source power supply. After a moment, this indicator will appear, indicating that the safety timer has been cancelled.

Peak cancellation timer

This indicator appears while the cancellation timer (100 seconds) is in operation and has not detected instability in the pin voltage after the start of charging. During this interval, the charging operation is not cut off even if the current adjustment control is turned, varying the voltage.

Nicad terminal voltage

This value indicates the voltage during charging. The voltage gradually increases as charging continues. Because the indicated value is updated frequently, this display can be used to check for voltage instability, etc.

Charging current

This value indicates the charging current. This value is set by turning the charging current adjustment knob.

High-speed charging

This indicator appears when the charging monitor lamp is red and the charging operation is initiated. When the charging operation is completed, this indicator disappears.

2-2. Charging Timer/Charging Capacity Meter Display

Charging Capacity Meter

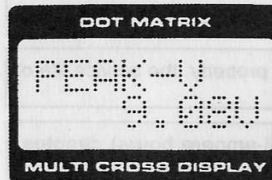
This value indicates how much the battery has been charged, based on the charging current that flows to the nicad battery and the amount of time that has elapsed. The unit of measure is the same as for the nicad capacity (mAh). Generally, when charging a battery that started with a remaining capacity of "0", this value becomes larger than the capacity indicated on the nicad cell, due to charging loss. This value can be used to compare the capacities of two different packs of the same type.

Charging timer

This value indicates the number of seconds that have elapsed since the start of charging.

* The values on this screen remain even after charging is completed, but are reset when charging is started again.

2-3. Nicad Peak Voltage Screen



- This screen first appears 100 seconds after the start of charging.
- During charging, the highest nicad pin voltage detected up to that point is displayed. After charging is completed to the delta peak, the auto cutoff function will be activated and displayed. (These values are reset the next time charging is started.)

*The peak voltage value becomes high in the following circumstances. Use these as guidelines regarding nicad battery deterioration and internal resistance.

1. When the charging current is high compared with other packs of the same type.
2. When the battery's internal resistance is high.
3. When the battery is charged once and is then charged again without being used in the meantime.
4. As the battery deteriorates (while the charging current remains the same).

2-4. Source Power Supply Screen



- This screen displays the voltage of the source power supply. This information can be used to check the load condition, etc., of the source power supply.

2-5. Connector Leads/Condition Monitor

- It is extremely important to note if the question mark ("?") indicator appears during or after charging. This mark appears if a major voltage fluctuation occurs, caused perhaps by a poor contact in the connector or deterioration of the nicad battery. There is a possibility of a bad contact in either the connector or in the output terminals. Check all contacts.










Note: Because Kondo's Hydropack is a customized nickel-hydride battery, the question mark indicator may appear even when there is no problem.

Note: The question mark indicator also appears if the charging current is set too high for a nicad battery that is not suited to rapid charging.

3. Determining the Charging Current (Important!)

- The rapid charging current that is suitable for a nicad battery differs for each type of battery. If the current setting is too high for a given battery, not only will the battery be harmed, but there is also a danger of leakage or explosion. Be certain to set the charging current at the value indicated in the instructions provided with the nicad battery.
- If you are not certain about what setting is appropriate, contact your dealer. Kondo cannot answer any inquiries concerning any batteries other than the ones that it sells.

4. Charging Procedure

- 1** Connect the charger's red alligator clip to the positive (+) power supply terminal, and the black alligator clip to the negative (-) power supply terminal. Make certain that the connections are not reversed.  Some sparking when the connections are made is normal.
- 2** Connect the red solder-plated lead of the nicad battery charging connector to the positive (+) output terminal and the black solder-plated lead to the negative (-) terminal. Make certain that the connections are not reversed.  The nicad battery must not be connected when performing this step. A short circuit could be dangerous.
- 3** Turn the charging current adjustment control all of the way to the left, and then connect the nicad battery to the charging connector. 
- 4** When the start button is pressed, the charging monitor lamp changes from green to red and charging starts. 
- 5** Slowly turn the charging current adjustment knob to set the proper charging current.  It is not necessary to set the number of cells.
- 6** While charging is in progress the Select button can be used to change the display screens. 
- 7** When charging is complete, the buzzer sounds.  After charging is completed, disconnect the nicad battery from the charger. Do not leave the fully charged battery connected to the charger.

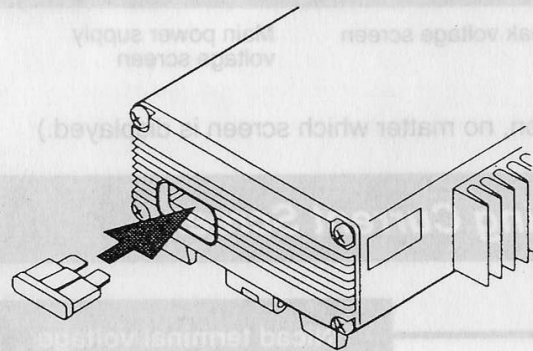
5. Observe the following points in order to get the best performance from the charger.

- The lead wires connected to the output terminals must be solder-plated. If they are not soldered, poor contact may result.
- If the current adjustment control is turned once charging has started, the charging operation may be cut off.
- One of the characteristics of LCDs in general is that their intensity changes with the temperature. If the LCD is exposed to high temperatures for an extended period of time, it will no longer be readable, but once the temperature is lowered, the display will function normally once again.
- Do not connect two or more nicad battery packs to the output terminals at one time. Only one pack can be charged at one time.
- If a battery is fully discharged, charging might start even if the polarity of the connections is reversed. Check the polarity very carefully when connecting a nicad battery for charging.
- Use only equipment from reputable manufacturers for the stabilized power supply. Using low-quality equipment with a high level of ripple noise or a car battery charger can damage this charger.
- Only connect a specially designed connector to the expansion terminal on the rear of the charger. Do not insert any other object. A metal object in particular could cause a short circuit and damage the charger.
- A 24V battery (source power supply) can be used if the terminal voltage is 25V or less. If the voltage is higher after the battery is in operation or after charging, it cannot be used.
- If a strong source of radio waves is located near this charger during charging, the charger may operate incorrectly.

Name of Each Part, and How to Connect Them

Fuse

This fuse blows if the source power supply connections are reversed. Replace the fuse by grasping it with radio pliers and then pulling out the fuse. When inserting the new fuse, be sure to push



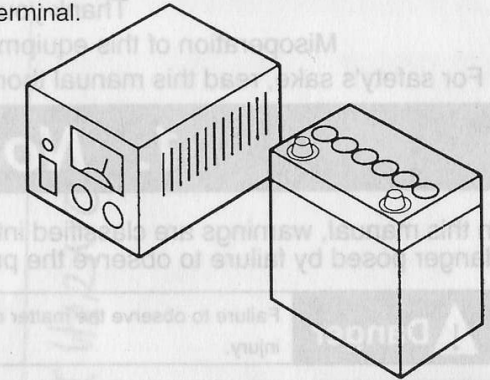
LCD display panel

Heat sink

This becomes hot!

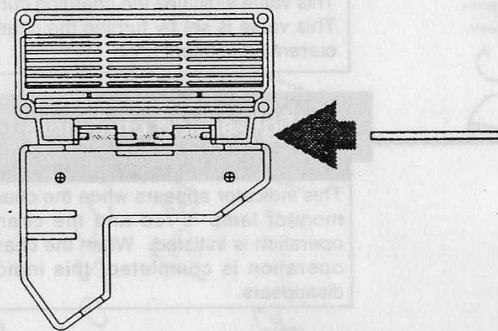
To the source power supply

Connect these clips to a battery or stabilized power supply. Connect the red clip to the positive (+) terminal and the black clip to the negative (-) terminal.



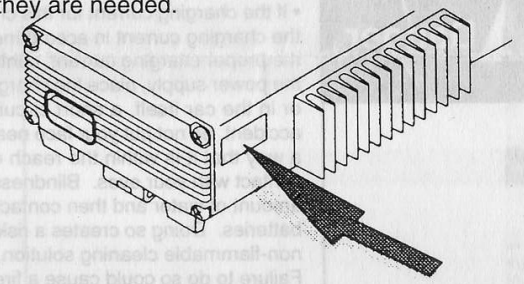
Optional equipment

The optional charger stand is attached as shown in the diagram below. Remove the pin before attaching the stand. A cooling fan can also be used.



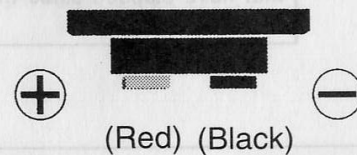
Extended function terminals

These terminals will be used with additional equipment planned for release in the future. Do not remove the seal covering these terminals until they are needed.



Output terminal

This is for connection to the charging connector. Make sure the polarity is correct!



Battery charging connector

Charging start button

Charging monitor lamp

(Red: Charging in progress) (Green: Standby)

LCD display select button

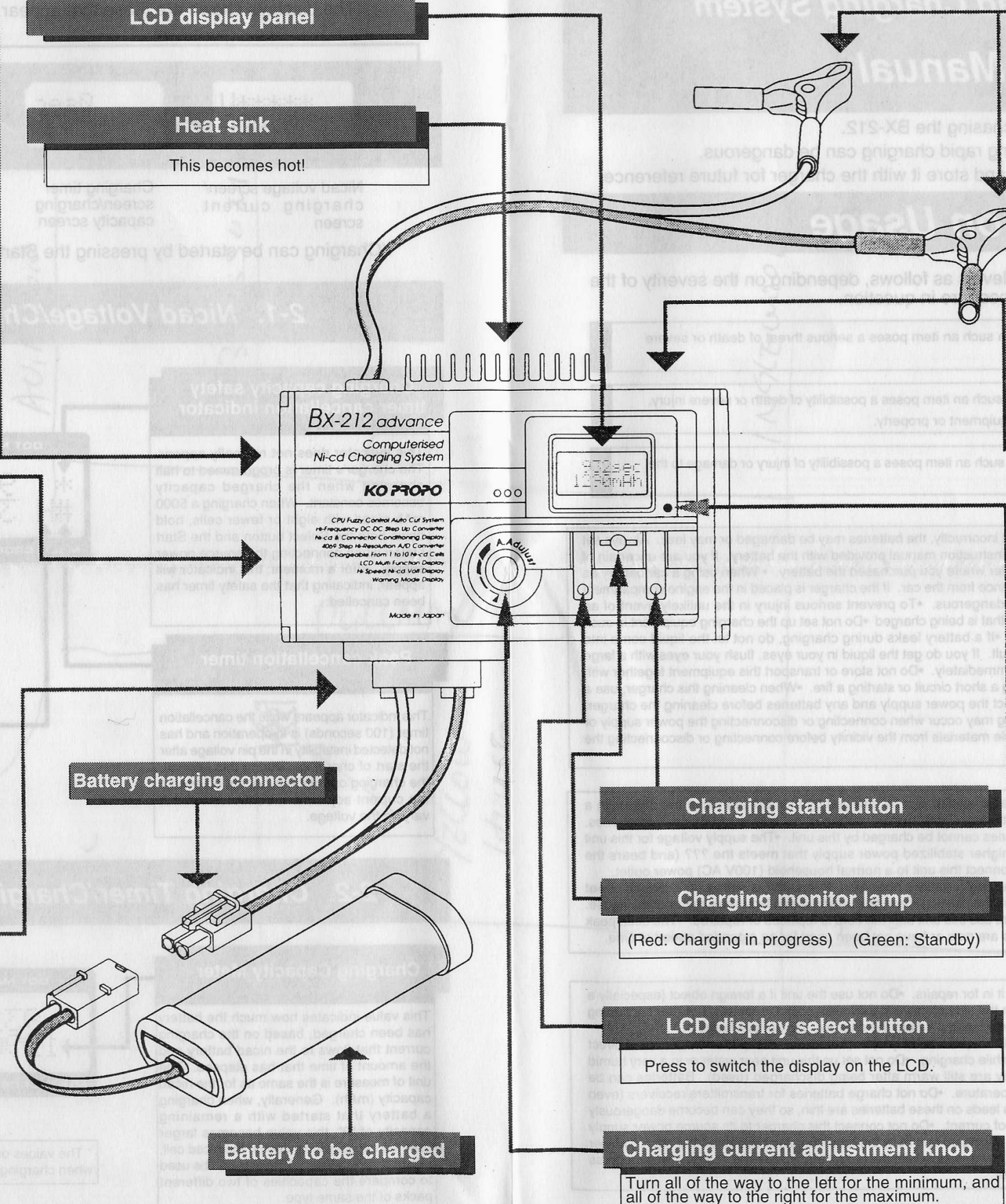
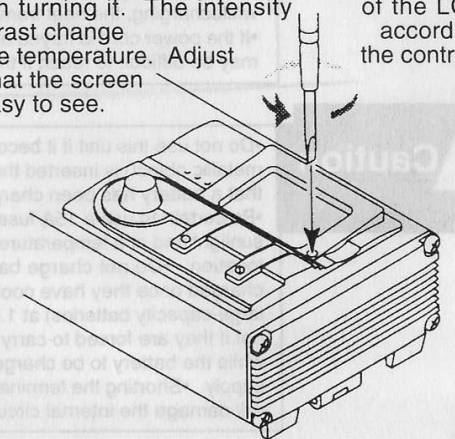
Press to switch the display on the LCD.

Charging current adjustment knob

Turn all of the way to the left for the minimum, and all of the way to the right for the maximum.

LCD contrast adjustment

Insert the screwdriver from the Precious EX-1 (sold separately) or a 2.4-diameter flat-head insulated screwdriver into the adjustment control and turn it slowly to adjust the LCD contrast. The internal control is not strong, so do not apply excessive force when turning it. The intensity of the LCD contrast change to the temperature. Adjust so that the screen is easy to see.



6. LCD Error Display

If an abnormality arises, an error is displayed on the LCD and the alarm sounds; if charging is in progress, charging is interrupted. Afterwards, pressing any button returns the display to the normal screen and charging can be restarted. However, if the cause of the original error is not resolved, the same error will recur.

LCD display	Description of problem and action to be taken	Alarm sound
Error 01	The source supply voltage is 10V or less.	Three beeps
Error 02	The source supply voltage is 25.6V or more.	Three beeps
Error 03	The charging current is 10 A or more. Disconnect the nicad battery immediately.	One long beep
Error 04	There is a problem with the electronic circuitry. Send the unit in for repairs.	One long beep
Error 05	The nicad battery is not connected or the connections are reversed.	No sound
Error 06	The charging capacity has been exceeded.	Four short beeps
Error 07	The nicad battery voltage is 19.9V or more.	Four short beeps

7. Warranty Limitations

- No warranty is made regarding the capacity or service life of batteries charged by this charger, or regarding the operation or operation time of equipment powered by a battery charged by this charger. The customer is responsible for monitoring the charge remaining in the battery and the service life of the battery.
- The display on this unit is not intended for use as a measuring tool. The accuracy of the values displayed is not guaranteed.
- The circuitry in this charger may generate electromagnetic waves. As a result, this unit may interfere with the operation of radios, cordless telephones, etc., in the vicinity. (This unit will not affect signals at the frequencies used by radio controlled vehicles.)
- This charger was designed and manufactured for Sanyo and Panasonic nicad batteries. Kondo can bear no responsibility for any consequences that arise if this charger is used to charge a battery that does not satisfy the necessary requirements, or if the instructions and warnings described in this manual are not heeded.

8. Requesting Repair Services

- If a problem arises with the charger, either as a result of accident or as a result of natural wear, and you send it in for repairs, describe the problem in as much detail as possible.

Doing so will allow our technicians to pinpoint the cause of the problem faster, reducing the length of time that we will have to hold the unit for repairs.

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9. Q & A

Question	Answer
Does rapid charging shorten the service life of a nicad battery?	As long as the charging current is set properly, the service life of the battery will not be shortened.
What do "v" and "mAh" on the nicad battery stand for?	"v" denotes voltage, and "mAh" (milli-ampere hours) denotes capacity.
How long does charging normally take?	Varies according to battery capacity and charging current. For a 1000mAh battery is about 1 hour. Time is 30 minutes if the charging current is 2A. However, faster charging will reduce operating time per charge.
What does it mean when charging is completed but the displayed charge is less than the capacity indicated on the nicad battery?	When a nicad battery is charged while it still has some charge remaining, the amount of charge that was added as indicated on the charger will differ from the capacity shown on the battery. If you leave the nicad battery alone until charging is finished, it will be fully charged.
Why does charging sometimes stop before it is completed?	If no error message was displayed, then charging has basically been completed. If the charged capacity and the indicated capacity do not agree, it is possible that the battery still had some charge remaining before it was charged, or else, after a battery was fully charged, the charging process was started again. In addition, if the battery is old and the cell capacity fluctuates, the delta peak may be generated for some of the cells before all of the cells are fully charged, which would cause the charger to terminate the charging process.
What does the "?" on the display mean?	It could mean a poor contact in the connectors, a damaged lead wire, or a problem with the nicad battery. The question mark appears when the internal resistance of the nicad battery is high.
Why do strange characters sometimes appear on the screen?	This happens when the internal computer is not operating properly. Disconnect the power source, wait one minute, and then connect the power supply again.
What is the flickering on the LCD that occurs during charging?	This is not a symptom of a problem. The flickering can be diminished by reducing the LCD contrast.
Is it possible to operate the charger off of a 24V battery?	It is possible, but not if the voltage is 25V or more.
Should I use a discharger?	If a nicad battery is repeatedly charged before it is fully discharged, the "memory effect" occurs, which results in reduced capacity. Use of a recharger is recommended in order to prevent this phenomenon from occurring.
What should I do if charging is interrupted and an error message appears?	Check the meaning of the error and then take the appropriate action.
Is there a problem if sparks appear when I connect the power supply or a battery?	This does not indicate a problem.
What should I do if the charger doesn't work?	Make sure that the power supply is connected properly, make sure that the fuse has not been blown, and check the supply voltage.
What causes the fuse to blow?	The fuse blows if the power supply connections are reversed.
Is it possible to turn off the charging monitor timer?	Hold down both of the buttons on the charger while connecting the power supply. Wait several seconds until the display appears; the charging monitor timer is now off.

10. Specifications

(Due to our continuing efforts to improve our products, these specifications are subject to change without notice.)

Type:	Nicad rapid charger using the DC/DC converter and step up and down method.
Constant current method:	High-frequency FET control and linear pulse method.
Charging current cutoff method:	Microcomputer controlled intelligent fuzzy delta peak cutoff.
LCD display:	8 characters x 2 lines; dot matrix.
Batteries that can be charged:	Nicad and Hydropack batteries, 50 to 5000mAh, 1 to 10 cells, (1.2V to 12V packs)
Charging current:	0.2 to 5.0A
Input power supply:	10 to 24V (DC), 10A or greater stabilized power supply, or 35Ah or higher battery
Dimensions/weight:	149 x 82 x 35 mm (excluding projections), 470g