

SPECIFICATIONS

Model : NC-MDU01BK

Customer : SANYO Energy (U.S.A.) Corporation
SANYO COMPONENT EUROPE CORPORATE GmbH

Date : JAN . 23 , 2007

APPROVED SIGNETURES

SANYO ELECTRIC CO., LTD
MOBILE ENERGY COMPANY

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Revised	Content	Sign	Revised	Content	Sign

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NC-MDU01BK		1/6								
1. Scope of application	This specification applies to the Battery charger manufactured by Sanyo Electric Co., Ltd. Mobile Energy Company for supply to SANYO Energy (U. S. A.) Corporation and SANYO COMPONENT EUROPE CORPORATE GmbH.									
2. Name	Battery Charger									
3. Model No.	NC-MDU01BK									
4. Applicable EMC	<p>(EMC) -This equipment has passed the test under connected to PC peripheral equipment.</p> <p>EN 55022:1998+A1:2000+A2:2003 EN 61000-3-3:1995:A1:2001 EN 55024:1998+A1:2001+A2:2003 IEC 61000-4-2:1995+A1:1998+A2:2000 IEC 61000-4-3:2002+A1:2002 IEC 61000-4-5:1995+A1:2000 IEC 61000-4-6:1996+A1:2000 IEC 61000-4-11:1994+A1:2000 FCC Part 15 SubpartB ClassB ANSI C63.4-2003</p>									
5. Rating	<table border="1" data-bbox="544 1068 1465 1550"> <tr> <td data-bbox="544 1068 903 1160">Input</td> <td data-bbox="903 1068 1465 1160">DC 5V 0.5A (MAX) (Connector type: Based on USB type A)</td> </tr> <tr> <td data-bbox="544 1160 903 1368">Output</td> <td data-bbox="903 1160 1465 1368">When 1 battery is charged (Quick charging mode) DC 1.2V 850mA X 1 (AA, AAA) When 2 batteries are charged (Normal charging mode) DC 1.2V 450mA X 2 (AA, AAA)</td> </tr> <tr> <td data-bbox="544 1368 903 1460">Operating temperature and humidity ranges</td> <td data-bbox="903 1368 1465 1460">5~35°C / 45~85%RH *1 0~40°C / 45~85%RH *2</td> </tr> <tr> <td data-bbox="544 1460 903 1550">Storage temperature and humidity ranges</td> <td data-bbox="903 1460 1465 1550">-20~60°C / 45~85%RH</td> </tr> </table> <p>*1 Guarantee of the electrical performances. *2 Guarantee of the operation can't be applicable for the following electric performances.</p> <p>8-1 : d. Charging time : e. Discharge capacity</p>		Input	DC 5V 0.5A (MAX) (Connector type: Based on USB type A)	Output	When 1 battery is charged (Quick charging mode) DC 1.2V 850mA X 1 (AA, AAA) When 2 batteries are charged (Normal charging mode) DC 1.2V 450mA X 2 (AA, AAA)	Operating temperature and humidity ranges	5~35°C / 45~85%RH *1 0~40°C / 45~85%RH *2	Storage temperature and humidity ranges	-20~60°C / 45~85%RH
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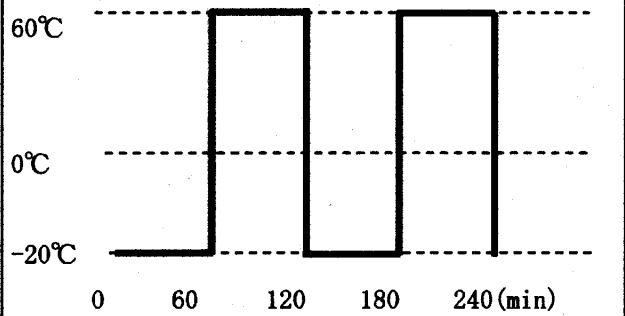
Specification No.	SPECIFICATION		Page
NC-MDU01BK			2/6
7. Specification			
a	Battery type	Ni-MH battery	
b	Applicable batteries	eneloop HR-3UTG (typ. 2000mAh, min. 1900mAh) HR-4UTG (typ. 800mAh, min. 750mAh)	
c	Protection timer (reference)	When 1 battery is charged HR-3UTG : approx. 140min. HR-4UTG : approx. 60min. When 2 batteries are charged HR-3UTG : approx. 280min. HR-4UTG : approx. 120min.	
d	Charging control method	Peak voltage detection method	
e	Output function	When 1 battery is charged: If battery voltage is less than 1.5V, it can charge by an average of 850mA. If battery voltage is more than 1.5V, it can charge by an average of 730mA. When 2 batteries are charged: If battery voltage is less than 1.5V, it can charge by an average of 450mA. If battery voltage is more than 1.5V, it can charge by an average of 390mA.	
f	Rechargeable terminal	+ : Rechargeable terminal - : Grounding terminal (2 Slots)	
g	LED display	<ul style="list-style-type: none"> • Charging Display Notice (LED = Light Emitting Diode) <ul style="list-style-type: none"> • No insert battery: LED no light • During Charge : LED blue blink (every 1.6 seconds) • Finish Charge : LED (On) blue light • Abnormal mode : LED blue blink (every 0.4 seconds) • Out of the temperature range when charging starts : LED blue blink (every 1.6 seconds) • Out of the temperature range when during charge : LED (On) blue light 	
h	Protection system	<ul style="list-style-type: none"> • <u>Protection timer</u> : 420 minutes • <u>Temperature protection</u>: Charge will be finished if battery temperature comes during charge beyond a predetermined value. (LED light is turned on) In case out of the predetermined temperature range at the time of a charge start, charge standby is carried out. (LED blinks every 1.6 seconds) • <u>Dry Cell Battery Charging protection</u>: Charging stops when battery voltage becomes more than predetermined voltage during charge. • <u>Output short protection</u>: When charge terminal voltage is lower than approx. 1.0V, trickle charging shall start and normal charging shall stand by. (LED blinks every 1.6 seconds) In case of not exceeding an approx. 1.0V in 20 minutes, charging would be stopped as an abnormal charge. (LED blinks every 0.4 seconds) Charge will be stopped if charge terminal voltage becomes lower than approx. 1.0V during charge. (LED blinks every 0.4 seconds) 	
8. Performance		<ul style="list-style-type: none"> • Standard conditions Unless otherwise specified, measurement should be carried out at temperature 5~35°C, humidity 45~85%, and atmospheric pressure 860~1060hPa. If there are doubts about results, condition should be performed at 20°C ±2°C, 60~70%, and 860~1060hPa. • Standard battery The battery shall be fully activated and discharged for 2.5 hours at constant current of 0.2It rate after full charge. • Discharge battery The battery shall be fully activated and discharged to the end voltage of 0.8V/cell at constant current of 0.2It rate. $It[A] = C_s [Ah] / [h]$ C_s : Rated capacity 	



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8-1 Electrical performance			
	Item	Condition	Standard
a	Input voltage range	DC 5V±0.25V	No miss-operation
b	Input current	Impress the rated input voltage and the input current should be measured when outputting the rated power.	0.5A or less
c	Charging current	1 or 2 standard batteries should be charged under the rated input voltage and then charging current should be measured after 5 minutes from start.	When 1 battery charged: battery voltage is less than 1.5V- 850mA±10% more than 1.5V- 730mA±10% When 2 batteries charged: battery voltage is less than 1.5V- 450mA±10% more than 1.5V-390mA±10%
d	Charging time	At the ambient temperature of 25±5°C, rated input voltage is impressed and then measure the time until the completion of charge displayed when charging 1 or 2 discharged batteries.	When 1 battery charged: HR-3UTG - 140min. ±20% HR-4UTG - 60min. ±20% When 2 batteries charged: HR-3UTG - 280min. ±20% HR-4UTG - 120min. ±20%
e	Discharge capacity	Discharged batteries shall be fully charged and then be discharged at 0.2It of constant current within 5 hours at the temperature of 25°C±5°C. Then measure the time until the end voltage goes down to 1.0V/cell.	More than 85% (VS minimum capacity) (Minimum capacity = Rated capacity)
f	Conducting and radiated emissions	It depends on EN55022-1 and FCC Part 15	Shall satisfy the standard.
g	Temperature rise	The maximum temperature of parts shall be measured when the discharged battery is charged under the rated input voltage and ambient temperature at 40°C.	It shall satisfy the safety regulation, and composition parts shall not exceed the maximum rated temperature.
h	Electrostatic discharge	During charging/standby, the specified amount of positive and negative static electricity shall be input from 150 pF capacitor through 330Ω resistor for 10 times respectively (EN61000-4-2). The discharge probe shall be shortened gradually. The residual electricity of the parts shall be discharged through 50Ω resistor after each test.	No miss-operation with ±5KV. No deterioration with ±10KV.

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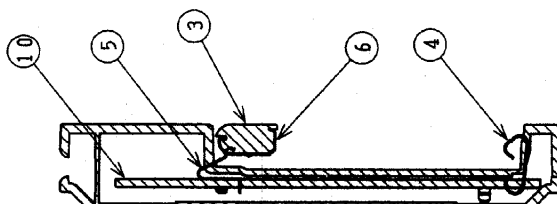
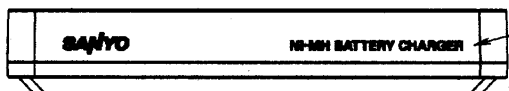
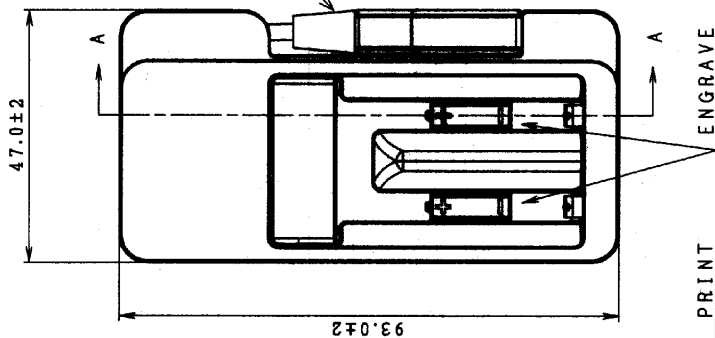
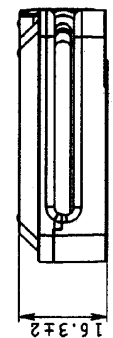
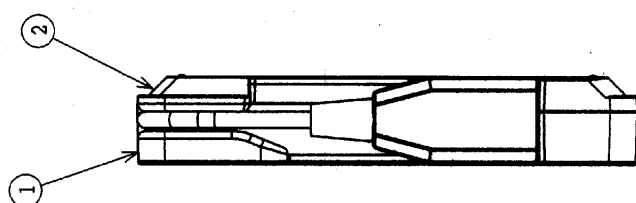
8-2 Mechanical performance

	Item	Condition	Standard
a	Insertion and removal of the battery.	AA and AAA type batteries shall be inserted and removed for 2000 times for each battery type.	The product shall operate properly after the test.
b	Vibration test	Frequency : 10~55Hz Accretion : 19.6m/s ² Vibration shall be applied in each X, Y and Z directions for 2 hours. (20min./cycle)	After the test, the components should not be damaged or dislodged, screws should not be loose, and product should satisfy the electrical performance in this specification.
c	Drop test	The product shall be dropped 1 time each on 6 directions from a height of 70cm on the wooden board.	After the test, the components shall not be damaged or dislodged by electric shock and flame. Product shall satisfy the electrical performance in this specification.
d	Connect test of the USB connector	The USB connector should be connected and disconnected to USB port for 2000 times.	The product should operate properly after the test.
e	Bend test of the USB cord	The USB cord shall be loaded with a weight of 100g. Bend the plug backwards and forwards with an angle 60° vertically from the cord for 2000 times, at a speed of 40 times/minute.	The product shall operate properly after the test.
f	Pull test of the USB cord	The USB cord shall be pulled by 30N for X, Y, and Z directions. Test part: The root of the USB code, and the bush of a USB connector	The product shall operate properly after the test.

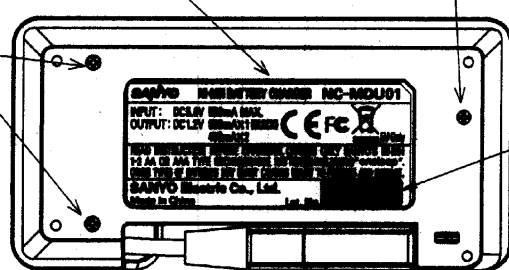
Specification No.	SPECIFICATION		Page
NC-MDU01BK			5/6
8-3 Environmental performance			
	Item	Condition	Standard
a	High temperature, high humidity Storage	The product shall be stored at 40°C, humidity 90% for 96 hours, and it shall be left under the standard conditions for more than 1 hour.	The product shall operate properly and satisfy electrical performances, withstand voltage and insulation resistance voltage.
b	Heat Shock	<p>The product shall be stored without applying power, in the condition of following; Temperature of -20°C/+60°C, 10 cycles, every 60 minutes. (drawing below)</p> 	The product shall satisfy electrical performances.
c	High temperature operation	The discharged battery shall be charged under the rated input voltage at 40°C ambient temperature.	The product shall operate properly No abnormal heat rising. (Temperature protection shall work normally.)
d	Low temperature operation	The discharged battery shall be charged with applying rated input voltage at 0°C ambient.	The product shall operate properly.
e	High temperature storage	The product shall be stored at 60°C for 48hours without applying input voltage, and then it shall be left in the standard condition for 1 hour.	The product shall operate properly and satisfy specifications and electric performances.
f	Low temperature storage	The product shall be stored at - 20°C for 48 hours without applying input voltage, and then it shall be left in the standard conditions for 1 hour.	The product shall operate properly and satisfy specifications and electric performances

Specification No.	SPECIFICATION	Page																		
NC-MDU01BK		6/6																		
9. Marking	<ul style="list-style-type: none"> Rating (Pasted on the case B) <div data-bbox="523 309 1316 651" style="border: 1px solid black; padding: 5px;"> <p>SANYO NI-MH BATTERY CHARGER NC-MDU01</p> <p>INPUT: DC5.0V 500mA MAX. OUTPUT: DC1.2V 850mA X1 (QUICK) 450mA X2</p> <p>CE FC  EU Only</p> <p>READ INSTRUCTION BEFORE CHARGING. CHARGE ONLY SANYO'S NI-MH 1-2 AA OR AAA TYPE RECHARGEABLE BATTERIES INCLUDING "eneloop". OTHER TYPES OF BATTERIES MAY BURST CAUSING INJURY TO PERSONS AND DAMAGE.</p> <p>SANYO Electric Co., Ltd. Made in China Lot. No. XXXXXXXXXX</p> </div> <ul style="list-style-type: none"> Product lot No. marking <div data-bbox="603 712 1228 1115" style="margin-left: 40px;">  <p style="margin-left: 100px;">Day</p> <p style="margin-left: 100px;">Month</p> <p style="margin-left: 100px;">Year</p> <table style="margin-left: 100px;"> <tr><td>Jan. -A</td><td>1-A</td></tr> <tr><td>Feb. -B</td><td>2-B</td></tr> <tr><td>...</td><td>...</td></tr> <tr><td>...</td><td>26-Z</td></tr> <tr><td>Dec. -L</td><td>27-7</td></tr> <tr><td>...</td><td>28-8</td></tr> <tr><td>...</td><td>29-9</td></tr> <tr><td>...</td><td>30-θ</td></tr> <tr><td>...</td><td>31-1</td></tr> </table> </div>	Jan. -A	1-A	Feb. -B	2-B	26-Z	Dec. -L	27-7	...	28-8	...	29-9	...	30-θ	...	31-1	
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10. Packaging	<ol style="list-style-type: none"> Package specification: Refer to the packaging drawing Package performance: Refer to following: <table border="1" data-bbox="523 1193 1481 1615"> <thead> <tr> <th>Item</th> <th>Method</th> <th>Rating</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Package Drop Test</td> <td><Drop Point> 1 corner, 3 different edges, and 2 planes (one time each)</td> <td rowspan="3">After the test, there shall be no problem of operation and appearance.</td> </tr> <tr> <td><Drop Area> On to concrete</td> </tr> <tr> <td><Drop Height> 1 corner : 50 cm 3 different edges : 50 cm 2 planes : 60 cm</td> </tr> <tr> <td rowspan="3">Package Vibration Test</td> <td><Times of Vibration> Three different direction</td> <td rowspan="3"></td> </tr> <tr> <td><Vibration Condition> Acceleration 9.8m/s² Frequency 5 ~ 50Hz</td> </tr> <tr> <td><Duration of Vibration> For 20min. per each Cycle</td> </tr> </tbody> </table>	Item	Method	Rating	Package Drop Test	<Drop Point> 1 corner, 3 different edges, and 2 planes (one time each)	After the test, there shall be no problem of operation and appearance.	<Drop Area> On to concrete	<Drop Height> 1 corner : 50 cm 3 different edges : 50 cm 2 planes : 60 cm	Package Vibration Test	<Times of Vibration> Three different direction		<Vibration Condition> Acceleration 9.8m/s ² Frequency 5 ~ 50Hz	<Duration of Vibration> For 20min. per each Cycle						
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	<Duration of Vibration> For 20min. per each Cycle																			
11. Incidental items	<ul style="list-style-type: none"> In case of the subject which is not covered with this specification, Sanyo Electric Co., Ltd. shall discuss and cooperate to solve the issue. The charger specified on this specification does not contain the environmental hazardous substance at the level of use prohibition which SANYO Electric Co., Ltd. Mobile Energy Company defines. 																			
12. Attached drawings and others	<ul style="list-style-type: none"> Overall view drawing Packaging drawing 																			

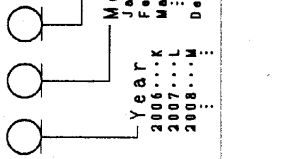
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CASE A	1	1 ABS (UL94HB)	COLOR: WHITE
CASE B	2	1 ABS (UL94V-2)	COLOR: GRAY
ADJUSTER	3	1 ABS (UL94HB)	COLOR: WHITE
TERMINAL A	4	2 C5210R-H, NI PLATED	
TERMINAL B	5	2 C5210R-H, NI PLATED	
TERMINAL C	6	2 C2680R-H, NI PLATED	
SCREW ROUND	7	3 M1.7x8	
RATING LABEL	8	1 YUPO PAPER	COLOR: BASE-GRAY LETTER: WHITE
DC CORD	9	1 PVC (UL2464)	COLOR: WHITE
PCB	10	1 CEM1 t=1.2	



SECTION A-A



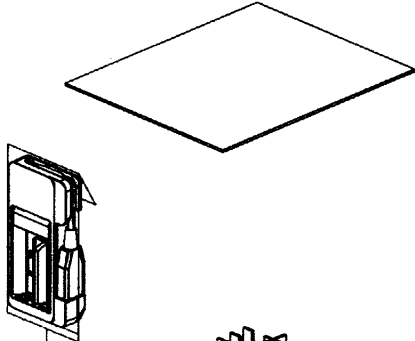
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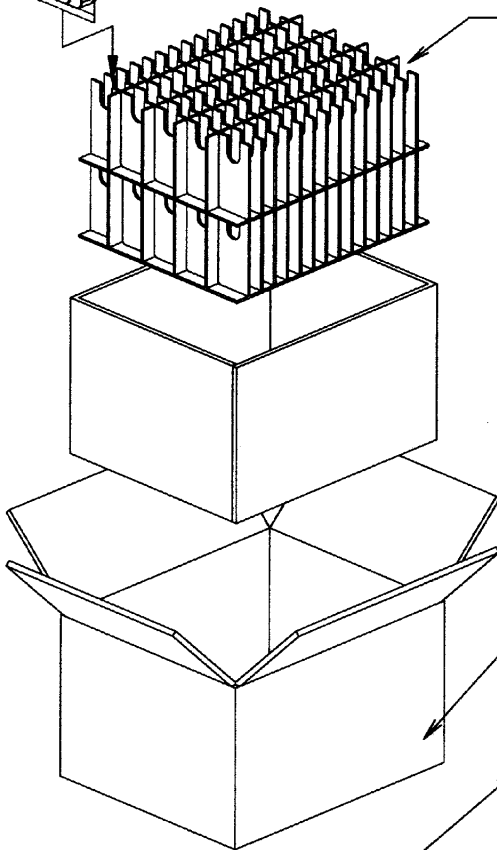
MODEL: NC-MDU01BK
 NAME: OVERALL VIEW DRAWING (CHARGER)

NC-MDU01BK PACKAGE DRAWING

PRODUCT
(with PE bag)



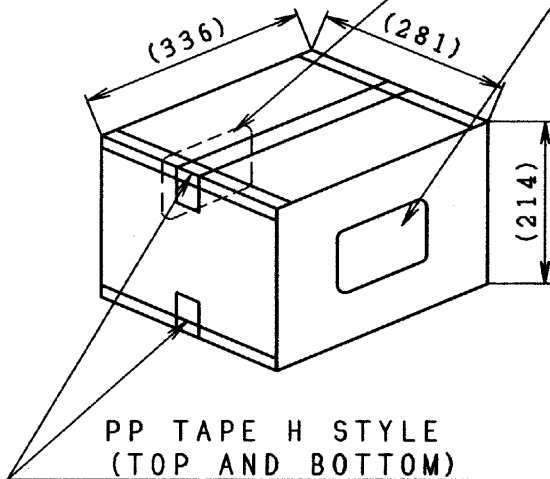
PRODUCT: 5x15x2=150PCS



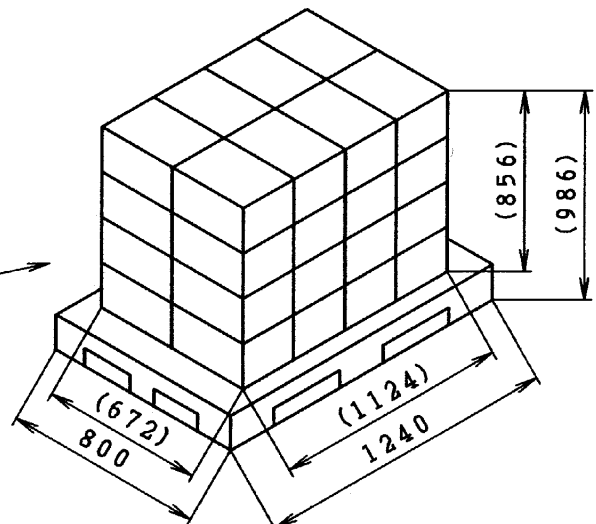
CARTON

CARTON LABEL

Type: NC-MDU01BK
 Code No. : 165201330
 Qty: 150 pcs
 Lot No. xxx
 SANYO Electric Co., Ltd.
 MADE IN CHINA



Weight: approx 9.5kg



CARTON: 8x4=32PCS
 PRODUCT: 32x150=4800SETS

*The size of () is rough estimate value.