

S P E C I F I C A T I O N S

Model : NC-MQR02N

(SANYO Model : NC-MQR02NWE-S)

Customer : SANYO COMPONENT EUROPE CORPORATE GmbH

Date : Nov. 30, 2005

APPROVED SIGNATURES

S A N Y O E L E C T R I C C O . , L T D .
M O B I L E E N E R G Y C O M P A N Y
C O N S U M E R P R O D U C T B U S I N E S S U N I T

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Revised	Content	Sign	Revised	Content	Sign

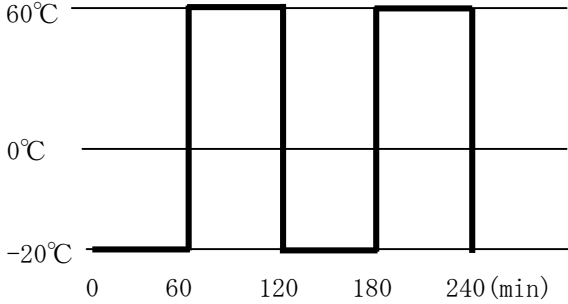
Specification No.	SPECIFICATION	Page								
NC-MQR02NWE-S		1/7								
1. Scope of application	This specification applies to the Battery charger manufactured by Sanyo Electric Co., Ltd. Mobile Energy Company for supply to SANYO COMPONENT EUROPE CORPORATE GmbH.									
2. Name	Battery Charger									
3. Model No.	<table border="1" data-bbox="529 492 1449 660"> <tr> <td data-bbox="529 492 1077 582">SANYO COMPONENT EUROPE CORPORATE GmbH</td> <td data-bbox="1077 492 1449 582">Sanyo Electric Co., Ltd. Mobile Energy Company</td> </tr> <tr> <td data-bbox="529 582 1077 660">NC-MQR02N</td> <td data-bbox="1077 582 1449 660">NC-MQR02NWE-S</td> </tr> </table>		SANYO COMPONENT EUROPE CORPORATE GmbH	Sanyo Electric Co., Ltd. Mobile Energy Company	NC-MQR02N	NC-MQR02NWE-S				
SANYO COMPONENT EUROPE CORPORATE GmbH	Sanyo Electric Co., Ltd. Mobile Energy Company									
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4. Applicable safety standard	EN60335-1, EN60335-2-29 IEC60335-1, IEC60335-2-29 AS/NZS 4417									
5. Rating	<table border="1" data-bbox="529 900 1378 1236"> <tr> <td data-bbox="529 900 890 945">Input</td> <td data-bbox="890 900 1378 945">100-240V\sim 50-60Hz 10W</td> </tr> <tr> <td data-bbox="529 945 890 1048">Output</td> <td data-bbox="890 945 1378 1048">1.2V --- 565mA\times4 (AA) 1275mA\times2 (AA) 310mA\times2 (AAA)</td> </tr> <tr> <td data-bbox="529 1048 890 1142">Operating temperature and humidity ranges</td> <td data-bbox="890 1048 1378 1142">5\sim35$^{\circ}$C / 10\sim90%RH *1 0\sim40$^{\circ}$C / 10\sim90%RH *2</td> </tr> <tr> <td data-bbox="529 1142 890 1236">Storage temperature and humidity ranges</td> <td data-bbox="890 1142 1378 1236">-20\sim60$^{\circ}$C / 10\sim90%RH</td> </tr> </table> <p data-bbox="529 1272 1378 1444">*1 Guarantee of the electrical performances. *2 Guarantee of the operation the following electric performances can't be applicable. 8-1: d. Charging time : e. Discharge capacity</p>		Input	100-240V \sim 50-60Hz 10W	Output	1.2V --- 565mA \times 4 (AA) 1275mA \times 2 (AA) 310mA \times 2 (AAA)	Operating temperature and humidity ranges	5 \sim 35 $^{\circ}$ C / 10 \sim 90%RH *1 0 \sim 40 $^{\circ}$ C / 10 \sim 90%RH *2	Storage temperature and humidity ranges	-20 \sim 60 $^{\circ}$ C / 10 \sim 90%RH
Input	100-240V \sim 50-60Hz 10W									
Output	1.2V --- 565mA \times 4 (AA) 1275mA \times 2 (AA) 310mA \times 2 (AAA)									
Operating temperature and humidity ranges	5 \sim 35 $^{\circ}$ C / 10 \sim 90%RH *1 0 \sim 40 $^{\circ}$ C / 10 \sim 90%RH *2									
Storage temperature and humidity ranges	-20 \sim 60 $^{\circ}$ C / 10 \sim 90%RH									
6. Appearance, dimensions and mass	<table border="1" data-bbox="529 1585 1378 1747"> <tr> <td data-bbox="529 1585 772 1639">Appearance</td> <td data-bbox="772 1585 1378 1639">Refer to the overall view drawing</td> </tr> <tr> <td data-bbox="529 1639 772 1693">Dimensions</td> <td data-bbox="772 1639 1378 1693">65 (W) \times 105 (L) \times 27.5 (H) mm</td> </tr> <tr> <td data-bbox="529 1693 772 1747">Mass</td> <td data-bbox="772 1693 1378 1747">95g\pm10%</td> </tr> </table>		Appearance	Refer to the overall view drawing	Dimensions	65 (W) \times 105 (L) \times 27.5 (H) mm	Mass	95g \pm 10%		
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7. Specification			
a	Battery type	Ni-MH battery / Ni-Cd battery	
b	Applicable batteries	HR-3U (typ. 2500mAh) / HR-3U (typ. 2300mAh) / HR-3U (typ. 2100mAh) / HR-4U (typ. 900mAh) HR-4U (typ. 750mAh) / N-3U (min. 1000mAh) / N-3U (min. 700mAh) / N-4U (min. 250mAh)	
c	Charging time (reference)	HR-3U (typ. 2500mAh min. 2300mAh) : Approx. 280min/Approx. 125min * HR-3U (typ. 2300mAh min. 2100mAh) : Approx. 255min/Approx. 115min * HR-3U (typ. 2100mAh min. 2000mAh) : Approx. 230min/Approx. 105min * N-3U (min. 1000mAh) : Approx. 110min/Approx. 50min * N-3U (min. 700mAh) : Approx. 80min/Approx. 35min * HR-4U (typ. 900mAh min. 840mAh) : Approx. 185min HR-4U (typ. 750mAh min. 700mAh) : Approx. 145min N-4U (min. 250mAh) : Approx. 50min “*” shows the charging time when placed in both ends only.	
d	The battery number which can be charged.	AA type battery: 1-4 AAA type battery: 1-2 *AA type battery and AAA- charge is possible to four in all in a battery.	
e	Charging control method	Peak detection method	
f	Output function	1-4 batteries can be charged with 565mA. When the battery voltage reaches over the specified voltage, it should be charged with 190mA. 1-2 batteries can be charged with 1275mA when placed in both ends only.	
g	LED display	<ul style="list-style-type: none"> • During charge : On (Red) • After full charge : Off • Abnormal condition of charge : blinking (Red), 0.4 s cycle • Temperature is out of specified range at the charging start. : blinking (Red), 1.6s cycle 	
h	Protection system	<ul style="list-style-type: none"> • <u>Protection timer</u> : Rapid charge shall be stopped within about 330 minutes from start. In case of 1275mA charge, rapid charge shall be stopped within about 165 minutes from start. • <u>Thermal protection for the charger</u> (By the power control IC.) • <u>Thermal protection for the battery</u> <ul style="list-style-type: none"> : When the battery is beyond the specified temperature, rapid charge shall be stopped. (LED off) : Rapid charge shall stand by, when the temperature is out of specified range at the charging start. (LED blinking, cycle:1.6s) • <u>Protection against charging dry cell</u> : When the voltage of battery charged with 190mA is beyond the specified voltage, charge shall be stopped. (This function prevents dry cell from causing electrolyte leakage.) • <u>Protection against short-circuit of output terminals</u> : While the battery is less than approx. 1.0V, trickle charging shall start and rapid charging shall stand by. 	
i	Maintenance charge function	<ul style="list-style-type: none"> • When all Battery finished charge , AA size Battery is maintenance charge (Average current about 5mA) AAA size Battery is maintenance charge (Average current about 3mA) * With no maintenance charge Timer. 	
j	An attached battery	HR-3U (typ. 2500mAh) 4 pieces	

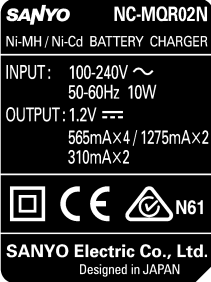

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8. Performance	<ul style="list-style-type: none"> • Standard conditions Unless otherwise specified, measurement should be carried out at temperature 5~35°C, humidity 45~85%, and atmospheric pressure 860~1060hPa. If there are doubts about results, condition 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. $I_t[A] = C_5[Ah] / [h] \quad C_5 : \text{Rated capacity}$ 		
8-1 Electrical performance			
	Item	Condition	Standard
a	Input voltage range	AC90~264V 47-64Hz	No miss-operation
b	Input power range	4 standard batteries should be charged under the rated input voltage and then input power should be measured after 5 minutes from start.	Less than 10W
c	Charging current	4 standard batteries should be charged under the rated input voltage and then charging current should be measured after 5 minutes from start.	DC565mA±15%
d	Charging time 1	4 discharged batteries should be charged at 25±5°C. (HR-4U, N-4U: 2 discharged batteries)	HR-3U (typ. 2500mAh) 280min. ±20% HR-3U (typ. 2300mAh) 255min. ±20% HR-3U (typ. 2100mAh) 230min. ±20% N-3U (min. 1000mAh) 110min. ±20% N-3U (min. 700mAh) 80min. ±20% HR-4U (typ. 900mAh) 185min. ±20% HR-4U (typ. 750mAh) 145min. ±20% N-4U (min. 250mAh) 50min. ±20%
	Charging time 2	2 discharged batteries placed in both ends should be charged at 25±5°C.	HR-3U (typ. 2500mAh) 125min. ±20% HR-3U (typ. 2300mAh) 115min. ±20% HR-3U (typ. 2100mAh) 105min. ±20% N-3U (min. 1000mAh) 50min. ±20% N-3U (min. 700mAh) 35min. ±20%

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e	Discharge capacity	Discharged batteries shall be fully charged and then discharged at 0.2It constant current at 25°C±5°C. Discharging time to 1V/cell shall be measured.	More than 85 % (VS nominal capacity)
f	Leakage current	It depends on EN 60335-2-29.	Less than 0.25mA
g	Insulation withstand voltage	AC3750V is input for 1minutes across primary-secondary and primary-non current carrying metal part.	There should be no insulation break.
h	Insulation resistance	At standard condition, primary-secondary resistance and primary-non-current carrying metal part resistance are measured with DC500V insulating meter.	More than 20MΩ
i	Conducting and radiated emissions	EN55014	The standard shall be satisfied.
j	Temperature	The maximum temperature shall be measured when the discharged battery shall be charged under the rated input voltage at 30°C.	EN60335-2-29 shall be satisfied and temperatures of the components shouldn't exceed specified maximum temperature.
		The maximum temperature shall be measured when the discharged battery shall be charged under the rated input voltage at 0~40°C.	The surface of the battery shall be less than 65°C.
k	Electrostatic discharge	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 residual electricity of the parts shall be discharged after each test. The discharge probe shall be shortended gradually.	No miss-operation with ±5KV. No deterioration with ±10KV.
l	Interrupting of input voltage	The rated input voltage should be interrupted for 20 ms with 100% dip every 10 seconds for 1 minute.	No miss-operation
m	Lightning surge	1.2×50 μs, 1kV of positive and negative voltage shall be input for 3times respectively.	The product should be safety.
n	AC line noise	Impulse width : 1 μs Impulse voltage : ±1kV	No miss-operation.

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8-2 Mechanical performance			
	Item	Condition	Standard
a	Insertion and removal of the battery.	The battery shall be inserted and removed for 2000 times.	The product should 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 should not be damaged or dislodged, and product should satisfy the electrical performance in this specification.
d	Endurance test of the AC Jack	The AC plug should be connected and disconnected to AC Jack for 2000 times. (AC plug : LS-7)	The product should operate properly after the test.
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 should operate properly and satisfy the electrical performance in this specification.
b	Temperature cycle	The product shall be stored with following temperature 10cycle, and it shall be left in under the standard conditions for more than 1 hour.  <p>The graph shows a temperature cycle between 60°C and -20°C. The x-axis represents time in minutes (0 to 240), and the y-axis represents temperature in degrees Celsius (-20°C, 0°C, 60°C). The temperature is constant at -20°C from 0 to 60 minutes, then rises to 60°C and stays there until 120 minutes. It then drops back to -20°C and stays there until 180 minutes. This cycle repeats once more, ending at 240 minutes.</p>	The product should operate properly and satisfy the electrical performance in this specification.

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c	High temperature operation	The discharged battery shall be charged under the rated input voltage at 40°C ambient.	The product should operate properly. Temperatures of the components should not exceed the specified maximum temperatures.
d	Low temperature operation	The discharged battery shall be charged with applying rated input voltage at 0°C ambient.	The product should operate properly.
e	High temperature storage	The product shall be stored at 60°C for 48 hours input voltage, and it shall be left under the standard conditions for 1 hour.	The product should operate properly and satisfy the electrical performance in this specification.
f	Low temperature storage	The product shall be stored at -20°C for 48 hours without applying input voltage, and it shall be left under the standard conditions for 1 hour.	The product should operate properly and satisfy the electrical performance in this specification.

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9. Marking	<ul style="list-style-type: none"> • Rating label (Pasted on the case B)  <ul style="list-style-type: none"> • Caution label (Pasted on the case B) • Origin Label (Pasted on the case B)  <ul style="list-style-type: none"> • Product lot No. marking <table style="margin-left: 40px; border-collapse: collapse;"> <tr> <td style="text-align: center;">○ ○ ○</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td></td> <td style="text-align: center;">-----</td> <td style="text-align: center;">-----</td> <td style="text-align: center;">-----</td> </tr> <tr> <td></td> <td style="text-align: center;">Year</td> <td style="text-align: center;">Month</td> <td style="text-align: center;">Day</td> </tr> <tr> <td></td> <td style="text-align: center;">2005...J</td> <td style="text-align: center;">Jan. ...A</td> <td style="text-align: center;">1...A</td> </tr> <tr> <td></td> <td style="text-align: center;">2006...K</td> <td style="text-align: center;">Feb. ...B</td> <td style="text-align: center;">2...B</td> </tr> <tr> <td></td> <td style="text-align: center;">2007...L</td> <td style="text-align: center;">Dec. ...L</td> <td style="text-align: center;">26...Z</td> </tr> <tr> <td></td> <td style="text-align: center;"> </td> <td></td> <td style="text-align: center;">27...7</td> </tr> <tr> <td></td> <td style="text-align: center;"> </td> <td></td> <td style="text-align: center;">28...8</td> </tr> <tr> <td></td> <td style="text-align: center;"> </td> <td></td> <td style="text-align: center;">29...9</td> </tr> <tr> <td></td> <td style="text-align: center;"> </td> <td></td> <td style="text-align: center;">30...θ</td> </tr> <tr> <td></td> <td style="text-align: center;"> </td> <td></td> <td style="text-align: center;">31...1</td> </tr> </table>	○ ○ ○									-----	-----	-----		Year	Month	Day		2005...J	Jan. ...A	1...A		2006...K	Feb. ...B	2...B		2007...L	Dec. ...L	26...Z				27...7				28...8				29...9				30...θ				31...1	
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