

NICKEL METAL HYDRIDE (NiMH) BATTERY PACK MAINTENANCE

- 1) If you are having trouble charging a NiMH battery pack, trickle charge it at 1/10C (1/10 its capacity) to wake it up and reach full capacity. This also applies to batteries that have been in long term storage.
- 2) Trickle charge times shown in the charts are for fully discharged packs.
- 3) Let batteries cool to room temperature before charging. Heating NiMH battery packs beyond 110 degrees indicates an overcharge condition and will lead to cell damage, loss of voltage and capacity.
- 4) NiMH cells are more sensitive to heat than NiCads. Overcharging causes the cells to vent and loose capacity. Charge with a charger that has an adjustable Delta Peak detection circuit set to .01 - .02 volts.
- 5) Store NiMH batteries with a reasonable state of charge. Do not dead short them or store them on a resistor.
- 6) Do not discharge NIMH batteries to less than .85 volts per cell. (3.4 volts for a 4.8 volt pack, 4.25 volts for a 6 volt pack, or 6.8 volts for a 9.6 volt transmitter pack).

Calculating charge time: (See yellow area of NiMH table)

Battery Capacity + 10% divided by charger output = charge time
(2000 mAh + 200 = 2200 ÷ 600 mA = 3.66 hours)

NICKEL METAL HYDRIDE (NiMH) BATTERY CHARGE/DISCHARGE INSTRUCTIONS

CAPACITY	CELL SIZE	TRICKLE RATE	TRICKLE TIME	MAX PEAK CHARGE RATE	MAX DISCHARGE RATE
160 mAh	1/3 AAA	16 mA	14 – 16 hrs	160 mA	480 mA
400 mAh	2/3 AAA	50 mA	7 – 8 hrs	400 mA	1200 mA
730 mAh	AAA	100 mA	8 – 9 hrs	500 mA	1000 mA
1000 mAh	AAA	100 mA	11 – 12 hrs	500 mA	1000 mA
700 mAh	2/3 AA	100 mA	7 – 8 hrs	500 mA	1000mA
1600 mAh	2/3 A	100 mA	16 – 17 hrs	600 mA	16 amps
2000 mAh	AA	100 mA	20 – 21 hrs	600 mA	20 amps
2100 mAh	4/5 A	150 mA	13 – 15 hrs	1 amp	30 amps
2150 mAh	4/5 A	150 mA	14 – 16 hrs	1.5 amps	10 amps
2600 mAh	AA	100 mA	27 – 28 hrs	600 mA	3 amps
2700 mAh	AA	100 mA	28 – 29 hrs	600 mA	3 amps
2700 mAh	A	200 mA	26 – 27 hrs	1.5 amps	10 amps
4000 mAh	4/5 A	500 mA	9 – 10 hrs	2.0 amps	10 amps
2400 mAh	4/5 sub-C	200 mA	11 – 13 hrs	3.0 amps	30 amps
4200 mAh	sub-C	420 mA	11 – 13 hrs	3.0 amps	35 amps
4500 mAh	sub-C	450 mA	11 – 13 hrs	3 amps*	35 amps
5000 mAh	sub-C	500 mA	11 – 13 hrs	3 amps**	40 amps
5000 mAh	C	500 mA	11 – 12 hrs	3 amps	15 amps
10000 mAh	D	600 mA	14 – 16 hrs	3 amps	15 amps

Calculate charge time: Battery Capacity + 10% divided by charger output = charge time
 (2000 mAh + 200 = 2200 divided by 600 mA = 3.66 hours)

Values Defined:

Cell Size is the size physical size of the cells that make up a battery pack. AAA, AA, C and D are the standard size batteries used in flash lights, TV remotes, etc. Fractional battery sizes are less common and not found at retail stores.

mA = milli-amps (1 mA is .001 amps) (1000 mA = 1 amp) (10000 mA = 10 amps)

mAh = milli-amp hour. Battery delivers its rated capacity for one hour. (1600 mAh battery will power a 1.6 amp load for one hour.)

NICKEL CADMIUM (NiCad) BATTERY PACK MAINTENANCE

NiCad Battery Pack Discharging:

It is necessary to discharge NiCad cells after every use because they develop a discharge “memory”. Each time you use the pack without fully discharging them the capacity reduces until the pack will no longer accept a charge. If you want to fully discharge a pack, do not discharge lower than 0.90 volts per cell which minimizes the possibility of cell reversal.

You can make your own discharger as follows:

For small AA & A size packs wire two #1157 automotive bulbs in parallel. For larger packs such as sub-C wire five #1157 bulbs in parallel. Discharge the pack until the lights are dim or until the pack reaches the following voltage.

4-cell (4.8 volt) Receiver Pack: 3.6 volts

5-cell (6.0 volt) Receiver Pack: 4.5 volts

8-cell (9.6 volt) Transmitter Pack: 7.2 volts

- 1) New battery packs require 4.6 full charge/discharge cycle to reach full capacity. Using a timed charger will destroy a pack that has not been discharged.
- 2) Trickle charge time listed in the chart is for a fully discharged pack.
- 3) Let batteries cool to room temperature before charging or discharging. Battery temperature above 125 degrees can lead to cell damage.
- 4) Charge batteries with a “peak” charger whenever possible. Use a voltmeter to monitor battery voltage during charging with simple charger. When peak is reached and voltage begins to drop the battery is fully charged.
- 5) Discharge the battery after every use and before storage.
- 6) Charging two packs with one charger can be done but both packs must be identical voltage, chemistry and mAh. Both packs must be discharged to 0.90 volts/cell before charging.

NICKEL CADMIUM (NiCad) BATTERY CHARGE/DISCHARGE INSTRUCTIONS

CAPACITY	CELL SIZE	TRICKLE RATE	TRICKLE TIME	MAX PEAK CHARGE RATE	MAX DISCHARGE RATE
1100 mAh	AA	100 mA	15 – 16 hrs	1.6 amps	10 amps
1400 mAh	A	100 mA	14 – 16 hrs	2 amps	10 amps
1500 mAh	4/5 A	150 mA	14 – 16 hrs	2.3 amps	15 amps
1700 mAh	A	150 mA	14 – 16 hrs	2.6 amps	20 amps
2200 mAh	Sub-C	200 mA	12 – 14 hrs	2 amps	20 amps
2500 mAh	Sub-C	250 mA	14 – 16 hrs	2.5 amps	30 amps
2600 mAh	½ D	260 mA	12 – 14 hrs	2.5 amps	15 amps
3000 mAh	C	350 mA	12 – 14 hrs	3 amps	20 amps
3500 mAh	C	350 mA	12 – 14 hrs	3 amps	15 amps
5000 mAh	D	500 mA	12 – 14 hrs	3 amps	15 amps

Calculate charge time: Battery Capacity + 10% divided by charger output = charge time
 (2500 mAh + 250 = 2750 divided by 2500 mA = 1.1 hours
 (2.5 A charge rate is 2500 mA)

Values Defined:

Cell Size is the size physical size of the cells that make up a battery pack. AAA, AA, C and D are the standard size batteries used in flash lights, TV remotes, etc. Fractional battery sizes are less common and not found at retail stores.

mA = milli-amps (1 mA is .001 amps) (1000 mA = 1 amp) (10,000 mA = 10 amps)

mAh = milli-amp hour. Battery delivers its rated capacity for one hour. (1600 mAh battery will power a 1.6 amp load for one hour.