

NiCd/NiMH BATTERY PACK CHARGER

INSTRUCTION MANUAL

**Please read and observe this manual
before taking this charger into operation.
Please keep this instruction manual with the charger.**

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1. OUTLINE OF THIS CHARGER

- This is a microprocessor controlled battery pack charger for charging PANASONIC NiCd(P- series) / NiMH(HHR- series) battery packs with capacities ranging from 1.4 to 16Ah, and the nominal voltage is from $1.2(V) \times 4(\text{cell}) = 4.8(V)$ to $1.2(V) \times 24(\text{cell}) = 28.8(V)$.
- The battery packs are fitted with an $10k\Omega$ NTC (type 103AT-2 maker Ishizuka Denshi).
- It operates on a worldwide input voltage of AC100-240V.
- The AC cable is detachable. Depending on the sales market the charger will be delivered with country specific 2m long AC cables.
- For connecting a battery pack the charger is fitted with a 1.0m long battery cable. Connector is needed to be prepared and attached by customer with his own responsibility.
- The actual charge status is indicated by two TOP-LED's.

2. IMPORTANT SAFETY INSTRUCTIONS

-SAVE THESE INSTRUCTIONS-

Please read and observe following safety precautions in order to avoid injury and damage to the property before using charger.

- Do not charge but specified battery packs.
This charger is only for NiMH and NiCd battery packs. Do not charge batteries that are not authorized or it may cause electrolyte leakage, extra heat, explosion and fire.
- Do not connect the battery pack backwards.
Or it may cause electrolyte leakage, extra heat, explosion and fire
- Use authorized power source.
Using the charger with unauthorized source may cause smoke, extra heat, explosion and fire.
- Do not disassemble or modify the charger.
Or it may cause electric shock, extra heat and fire.
- Do not expose the charger to water.
Do not soak the charger into water and do not use it in wet condition, or it may cause short circuit, electric shock, extra heat and fire.
- Avoid operation that damages the supply cord and plug.
Continuous use with damaged cord and plug may cause electric shock and fire.
- Do not insert metal object into charger, connection part of supply cord and charge terminals.
It may cause electric shock, extra heat and fire.
- When a child use the charger, please tell him/her the manual well.
Please watch him/her while using the charger so as not to use it in a wrong way. And please use the charger where infants cannot reach. It may cause electric shock and injury.

- Do not use the charger if case, cord and plug become damaged or connection is loose.
It may cause electric shock, extra heat and fire.
- Do not handle the plug with wet hand.
It may cause electric shock.
- Take care to ensure that the plug, the power source and the charger fit correctly.
Incorrect fit may cause electric shock and fire.
- Remove the dust on the plug regularly.
Collected dust may cause fire.
- Charge batteries in the temperature range 0-40°C.
Charging in the temperature out of this range may cause electrolyte leakage, extra heat and explosion.
- Avoid damp and dusty place.
Or it may cause electric shock, extra heat and explosion.
- Do not use and keep the charger in hot place like outside under direct sunshine or heater.
Or it may cause battery leakage, extra heat, explosion and fire.
- Hold the plug when cord is pulled out.
Holding cord may cause damage to the cord itself, and may cause electric shock, extra heat and fire.
- Do not charge battery longer than time that is shown in specification.
Or it may cause electrolyte leakage, extra heat and fire.
- Pull out the plug from AC-socket when charger is not in operation.
Or it may cause electric shock and fire from leakage of electricity.
- Avoid sticking pins and dust on the plug and charge terminals.
Or it may cause electric shock, short circuit and fire.
- Disconnect the plug from the power source immediately when the charger seems to be in trouble.
Or it may cause electric shock, extra heat and fire.
- Do not put things on the charger and do not put the charger on the unstable place from which the charger may fall easily.
The charger may be damaged and it may cause electric shock, extra heat and fire.
- Do not touch switch on backside of the charger.
The switch is previously set for the type of battery pack by the dealer/maker. Please do not change initial setting. Or it cannot charge battery pack with adequate charge control and it may leads to short life of battery pack.
- Do not use attached AC cord set to the other instruments.
Or it may cause a damage to those instruments.

3. DESIGN AND SPECIFICATIONS

Battery Technology:	PANASONIC NiCd (P- series) / NiMH (HHR- series) battery
Battery Capacity:	1.4-16.0Ah
Number of cells:	10 - 24cell-series pack (with rapid charge termination – $\Delta V \leq 10\text{mV/cell}$) 4 - 9cell-series pack (with rapid charge termination – $\Delta V \leq 15\text{mV/cell}$)
Size:	Height 82 x Width 189 x Depth 132mm
Weight:	0.8kg
Charging Voltage:	DC 3.5-42V
Charging Current:	DC 2A continuously / pulsed
Output Power:	max. 80W
Temperature Measurement:	NTC (103AT-2 by Ishizuka Denshi)
Charging Characteristic	Set by the dealer/maker with SW100 switch
Input Voltage Range:	AC100-240V single phase
Input Frequency:	50/60Hz
Input Current:	max. 2.0A
Inrush Current:	max. 60A (cold start)
Input Power:	max. 100W
Efficiency:	min. 80%
Leakage Current:	0.25mA(rms)
Operation Temperature:	+0-+40°C
Storage Temperature:	-15-+50°C
Operation Environment:	Indoor use only (dry environment)
Rel. Air Humidity Operational:	10-80%
Rel. Air Humidity Storage:	5-90%
Safety Class:	II
Protection Class	IP20

4. CONNECTOR

When connectors are mounted to the charger and the battery pack, please observe the following cautions.

- Please observe the polarities that are shown in the following table, and mount connectors to the charger and the battery pack correctly. If the connectors are mounted in wrong polarity, the charge will not be done correctly.






	Charger Side (3 Cables)	Battery Pack Side (3 Cables)
Positive Cable	Red	Red
Negative Cable	Black	Black
Temperature Detection Cable	White	White(NTC)

- Please observe the instruction of connector maker when connectors and cables are connected.
- Use connector with current capability of $\geq 3\text{A}$ and voltage capability of $\geq 50\text{VDC}$
- Please pull out the plug of the charger from AC-socket before the connector is mounted to the charger.
- Do not short the positive and the negative of the battery pack while mounting connector to the battery pack.
- Please take caution not to get injured while mounting connector. And please take caution not to get burned or get fire in soldering the cables to the connector.
- When the battery pack has different color or number of cables, please ask to the maker before connecting cables and connectors.

5. OPERATION

- Connect the supply cord correctly to AC-input terminal on the backside of charger, and connect the plug correctly to the AC-socket. Then red and green LEDs are on.
- Connect the charger and battery pack correctly, and charge starts.
- Green LED is on during rapid charge mode.
- Trickle charge starts after rapid charge termination. Green LED blinks rapidly during trickle charge.
- Trickle charge stops when 10h passed after charge starts. Green LED blinks slowly when all charge process ends.
- When initial battery pack temperature is too high ($>40^{\circ}\text{C}$) or too low ($<0^{\circ}\text{C}$), charger is in battery over/under temp mode. Red LED is on in this mode. Rapid charge starts automatically when battery pack is in adequate temperature.
- Red LED blinks rapidly when charge error is detected. When error mode is found, please disconnect supply and battery pack from charger, and reconnect them and start charge. If situation is unchanged, please ask to the maker.

6. CHARGE MODE INDICATIONS

	Rapid Charge
	Trickle Charge
	End of Charge
	Battery Over/Under Temperature
	Error

7. LED INDICATIONS

Charge Mode	Red LED	Green LED
AC ON / Stand-by	ON	ON
Rapid Charge	OFF	ON
Trickle Charge	OFF	Blink Rapidly
End of Charge	OFF	Blink Slowly
Battery Over / Under Temp.	ON	OFF
Error	Blink Rapidly	OFF