Ni-MH Batteries Handling Precautions for Safe Use

Carefully read these instructions before using Ni-MH batteries for the first time.

For your safety and that of your customers, observe all cautionary information provided in this manual. Save this manual for future reference. The following information is intended to highlight potential safety hazards that can be associated with the misuse, misapplication or damage of NiMH batteries. Please carefully evaluate the information in this section when using Ni-MH batteries (single cells or assembled batteries) or when using or manufacturing equipment incorporating Ni-MH batteries. This catalogue is not a substitute for independent evaluation of equipment incorporating Ni-MH batteries. Customers incorporating Ni-MH batteries into their equipment must assure that their completed product has been properly designed, manufactured and tested. End users of equipment incorporating Ni-MH batteries should also be provided with sufficient warnings and instructions on their safe operation. As appropriate, some or all of the following warnings and information should be incorporated into the instruction manual accompanying your equipment.

⚠DANGER

1. Failure to carefully observe the following procedures and precautions can result in leakage of battery fluid (electrolyte), heat generation, bursting, fire and serious personal injury.
   Never dispose of Ni-MH batteries in a fire or heat them. Doing so may melt the insulation, damage the gas release vents or protective devices, ignite hydrogen gas, and cause leakage of battery fluid (electrolyte), heat generation, bursting and fire.
   Do not connect the ⊕ (positive) and ⊖ (negative) terminals of Ni-MH batteries together with electrically conductive materials, including lead wires.
   Do not transport or store Ni-MH Battery with their terminals uncovered or in contact with a metal objects (such as a necklace) or other conductive material. Doing so may cause short circuit, which would result in excessive current flow and possibly cause leakage of battery fluid, heat generation, bursting and fire. When carrying or storing batteries, use an appropriate case.
   Only charge Ni-MH batteries using chargers that satisfy FDK's specifications. Only charge batteries under the conditions specified by FDK. Failure to follow proper charging procedures may cause excessive current flow, loss of control during charging, leakage of battery fluid, heat generation, bursting and fire.
   Never disassemble Ni-MH batteries. Doing so may cause an internal or external short circuit or result in exposed material of battery reacting chemically with the air. It may also cause heat generation, bursting and fire. Also, this is dangerous as it may cause exposure to alkaline fluid.
   Never modify or reconstruct Ni-MH batteries. Protective devices to prevent danger are built into batteries (single cells or assembled batteries). If these are damaged, excessive current flow may cause loss of control during charging or discharging of the battery, leakage of battery fluid, heat generation, bursting and fire.
   Never solder lead wires directly on to Ni-MH batteries. The heat of the soldering operation may melt the insulation, damage the gas release vents or protective devices, cause leakage of battery fluid, heat generation, bursting and fire.
   The ⊕ (positive) and ⊖ (negative) terminals of Ni-MH batteries are predetermined. Do not force the terminal connection to a charger or equipment. If the terminals cannot be easily connected to the charger or equipment, check if the ⊕ and ⊖ terminals are correctly positioned. If the terminals are reversed, during charging the battery may be discharged rather than charged. Furthermore, reversed connections may cause abnormal chemical reaction in the battery, the flow of abnormal currents, leakage of battery fluid, heat generation, bursting and fire.
   The gas release vent which releases internal gas is located in the ⊕ positive terminal of the Ni-MH batteries. For this reason, never deform this section or cover or obstruct its gas release structure. If this section is deformed or covered or obstructed, the gas release vent will not function

properly, possibly causing leakage of battery fluid, heat generation, bursting and fire.
Do not directly connect Ni-MH batteries to a direct power source or the cigarette lighter socket in a car. High voltage may cause excessive current flow, leakage of battery fluid, heat generation, bursting and fire.
Do not use Ni-MH batteries in any equipment other than those specified by FDK. Depending on the equipment being used, doing so may cause abnormal current flow, leakage of battery fluid, heat generation, bursting and fire.

2. Ni-MH batteries contain a strong colorless alkaline solution (electrolyte). Alkaline solution is extremely corrosive and will cause skin damage. If any fluid from Ni-MH batteries comes in contact with a user's eyes, they should immediately flush their eyes and wash them thoroughly with clean water from a tap or another source and consult a doctor immediately. Strong alkaline solution can damage eyes and lead to permanent loss of eyesight.
3. When Ni-MH batteries are to be incorporated in equipment or housed within a case, avoid airtight structures as this may lead to the equipment or case being damaged or may be harmful to users.

⚠WARNING

1. Do not apply water, seawater or other oxidizing reagents to Ni-MH batteries, as this can cause rust and heat generation. If a battery becomes rusted, the gas release vent may no longer operate, and can result in bursting.
2. Do not connect more than 21 Ni-MH batteries in series, as this may cause electrical shocks, leakage of battery fluid and heat generation.
3. Keep Ni-MH batteries or the equipment out of the reach of infants and small children, in order to avoid them swallowing batteries. In the event the batteries are swallowed, consult a doctor immediately.
4. Do not charge or use Ni-MH batteries with the ⊕ and ⊖ terminals reversed. Charging batteries with the terminals reversed may discharge rather than charge the batteries, or it may cause abnormal chemical reaction in the batteries. Using batteries with the terminals reversed may discharge with of abnormal current, leakage of battery fluid, heat generation, bursting and fire.
5. Do not over-charge Ni-MH batteries by exceeding the predetermined charging period specified by the battery charger's instructions or indicator. If Ni-MH batteries are not fully charged after the battery charger's predetermined charging period has elapsed, stop the charging process. Prolonged charging may cause leakage of battery fluid, heat generation, bursting. Be sure to handle recharged batteries carefully as they may be hot.
6. Do not use Ni-MH batteries if the outer tube/label is scratched or damaged. Doing so will expose the battery to the risk of a short circuit, and may cause leakage of battery fluid, heat generation, bursting and fire.
7. Do not remove the outer tube from a battery or damage it. Doing so will expose the battery to the risk of a short circuit, and may cause leakage of battery fluid, heat generation, bursting and fire.
8. If Ni-MH batteries leak fluid, change color, change shape, or change in any other way, do not use them, otherwise they may cause heat generation, bursting and fire.
9. Ni-MH batteries contain strong colorless alkaline solution (electrolyte). If the skin or clothing comes in contact with fluid from a Ni-MH batteries. Battery fluid can irritate the skin thoroughly wash the area immediately with clean water from the tap or another source.
10. When transporting Ni-MH batteries, pack them carefully so that the batteries inside the case are not moved.

⚠CAUTION

1. Do not strike or drop Ni-MH batteries. Sharp impacts or concussions to Ni-MH batteries may cause leakage of battery fluid, heat generation, bursting and fire.
2. Store Ni-MH batteries out of the reach of infants and small children. When charging or using a battery, do not let infants or small children remove the battery from the charger or the equipment being used.
3. Children should not use Ni-MH batteries unless they have been carefully instructed on the contents of this instruction manual and their parents or guardians have confirmed that the children understand and appreciate the proper usage and safety hazards presented by the batteries.
4. Do not charge Ni-MH batteries if they have been cooled to 0°C or below. Doing so may cause leakage of battery fluid, impair performance or shorten operating life of Ni-MH batteries.
5. Do not use or store Ni-MH batteries at high temperature, such as in strong direct sunlight, in cars during hot weather, or directly in front of a heater. This may cause leakage of battery fluid. It could also impair performance and shorten battery life of Ni-MH batteries.
6. Do not use old and new batteries mixed together, or batteries at different charge levels. Do not use Ni-MH batteries mixed together with a dry cell or other battery of a different capacity, type, or brand name. This may cause leakage of battery fluid and heat generation.
7. When more than two batteries are to be used together, charge them simultaneously prior to use. If they are not charged at the same time, it could

cause leakage of battery fluid and heat generation.

8. Do not connect Ni-MH batteries in parallel as this may cause leakage of battery fluid, heat generation, bursting and fire.
9. For the recommended charging method for Ni-MH batteries, read the battery charger's instruction manual carefully.
10. Do not place or cover flammable materials on the battery while charging or discharging the Ni-MH batteries. It may cause leakage of battery fluid, heat generation, bursting and fire.
11. If Ni-MH batteries do not perform or function well with certain subject, refer to the instruction manual or warnings of the subject equipment.
12. Do not charge Ni-MH batteries beyond the recommended time described in the instruction manual for the charger or equipment. Overcharging cause leakage of battery fluid, heat generation, bursting and fire. It could also impair performance and shorten battery life of Ni-MH batteries.
13. After long term storage, there is a possibility that a battery cannot be fully charged. In order to fully charge it, charge and discharge the battery a few times.
14. Be sure to turn off the equipment after use of Ni-MH batteries, as this may result in leakage of battery fluid.
15. After they have been removed from equipment, store Ni-MH batteries in a dry place and within the recommended storage temperature range. This will help preserve the batteries' performance and durability and to minimize the possibility of leakage of battery fluid or corrosion. (For the indicated storage temperature range, refer to the rating table of this catalogue. FDK recommends a temperature range from -20 to 30 °C for longer battery life).
16. Before using Ni-MH batteries, be sure to read the instruction manual and all precautions carefully, then store the manual and precautions carefully to use as reference when the need arises. If you have specific questions about the instruction manual or the precautions, contact FDK at the location listed on the last page of this catalogue.
17. If corrosion, heat generation or other abnormalities with new Ni-MH batteries are detected, immediately stop using them and return them to the store or FDK that they were purchased from.
18. If the Ni-MH battery terminals become dirty, clean them with a soft dry cloth prior to use. Dirt on the terminals can result in poor contact with the equipment, loss of power, or inability to charge.
19. When incorporating Ni-MH batteries into their equipment or case, use materials with alkali resistance for the contact point and terminal of the battery. (Copper-containing materials can cause rust and corrosion problems.)
20. Batteries have a limited lifetime. Even in the same equipment, the battery life varies depending on the ambient temperature during operation and number of charge/ discharge cycles. Therefore, if the operating time of a Ni-MH battery becomes much shorter than its initial operating time, even after recharging, it is most likely near the end of its battery life and should be replaced with a new battery.

Ni-MH Battery

High Durability for In-Vehicle Applications

High Durability

High-Rate Discharge

Standard

Dry Cell Compatible

Battery Pack, Battery System

Charger

Precaution

Transport SDS

Lithium Battery

Cylindrical-type
- Primary Lithium Batteries - High Power
- Primary Lithium Batteries - High Capacity

Thin-type

Coin-type
- Primary Lithium Batteries
- Rechargeable Lithium Batteries

Environment Precaution

Transport Dimensions

SDS UL

Alkaline Battery

Premium

High Power

Universal Power

Environment

Precaution

SDS

Japanese

Web catalog

Inquiry