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Lithium batteries Handling Precautions for Safe Use

Carefully read these instructions manual before using lithium batteries for the first time.

Lithium batteries contain combustible materials such as lithium metal, lithium alloy and organic solvent. Improper handling can lead to leakage, heat generation, explosion or fire. To prevent accidents, pay sufficient attention to the following precautions. Also refer to them when you are describing in your instruction manual how to handle lithium batteries used in your application.

Thin-type primary and coin-type primary/rechargeable lithium batteries

⚠DANGER(Coin-type batteries)

1. Keep batteries out of infants' reach.

If a battery is swallowed, it can lead to chemical burns, penetration of mucosal tissue and, in the worst case, death. A swallowed battery must be removed urgently. Contact a doctor immediately for instructions.

⚠WARNING

1. Do not use batteries for unspecified purposes.

Different terminal structure may suffer from contact failure. Differences in specifications may damage the battery or application, which can lead to leakage, heat generation, explosion or fire.

2. Do not charge (Primary batteries: OF and CR series).

When the battery is charged, gas is generated inside and it raises internal pressure, resulting in leakage, heat generation, explosion or fire.

3. Do not charge with unspecified conditions (Rechargeable batteries: ML series)

Doing so may generate gas inside the battery, resulting in leakage, heat generation, explosion or fire.

4. Do not throw batteries into fire. Do not heat or disassemble batteries.

Doing so may damage insulation, which can lead to leakage, heat generation, explosion or fire.

5. Do not insert batteries with the positive \oplus and negative \ominus polarities reversed.

Make sure the polarities are in the right position when inserting the batteries into the application. When using 3 or more batteries, the application may operate even though one of the batteries is improperly inserted but this may cause leakage, heat generation, explosion or fire.

6. If leaked liquid gets in the eyes, it can cause eye injury.

Wash the eye(s) with clean water and receive medical care immediately.

7. If leaked liquid gets into the mouth, rinse the mouth well and consult with a doctor immediately.

8. Do not short-circuit

If the positive \oplus and negative \ominus terminals come into contact with metal objects, short circuit occurs and excessive current flows at once resulting in leakage, heat generation, explosion or fire. When carrying or storing the batteries, avoid direct contact with metal objects such as bracelets or key chains by putting them in a separate container.

9. In case of leakage or a strange smell, move the battery away from possible sources of fire immediately.

Leaked electrolyte may catch fire.

10. Do not solder directly on the battery.

Doing so may damage insulation, which can lead to leakage, heat generation, explosion or fire.

11. Do not apply strong pressure to the batteries nor handle roughly.

Doing so may cause leakage, heat generation, explosion or fire. Do not use a dropped battery as it may have been damaged.

12. Make sure to insulate battery terminals with vinyl tape when disposing of or storing them to avoid short circuit.

Putting batteries together disorderly or in contact with metal objects may cause short-circuit, resulting in leakage, heat generation, explosion or fire.

13. Do not use new and used batteries together. Do not use different types of batteries together.

Difference in their characteristics may cause leakage, heat generation, explosion or fire.

14. Do not stick batteries on the skin.

Doing so may cause skin injury.

⚠CAUTION

1. Make sure to insert batteries in the application so that the positive \oplus and negative \ominus terminals may not come into contact with metal parts of the application.
2. Do not use or leave the batteries exposed to heat such as a front of window in direct sunlight or inside a car under sunlight.
Doing so may cause leakage, heat generation, explosion or fire.
3. Avoid contact with water.
Doing so may cause leakage, heat generation, explosion or fire.
4. Read the application's instruction manual and precautions carefully before use.
The specifications or performance of these batteries may not match some usages or types of application.
5. Store and use the batteries away from direct sunlight, high temperature and high humidity
Otherwise, it can lead to leakage, heat generation, explosion or fire. If stored or used in such environment, batteries may suffer from deteriorated performance and life.
6. Do not use the batteries if you notice heat generation, deformation or other abnormal situations while using or storing them.
These can lead to leakage, heat generation or explosion.
7. For proper disposal of batteries, refer to local regulations.

Cylindrical-type primary lithium batteries

⚠WARNING

1. Do not use batteries for unspecified purposes.
Different terminal structure may suffer from contact failure. Differences in specifications may damage the battery or application, which can lead to leakage, heat generation, explosion or fire.
2. Do not charge.
When the battery is charged, gas is generated inside and it raises internal pressure, resulting in leakage, heat generation, explosion or fire.
3. Do not throw batteries into fire. Do not heat or disassemble batteries.
Doing so may damage insulation, which can lead to leakage, heat generation, explosion or fire.
4. Do not insert batteries with the positive \oplus and negative \ominus polarities reversed.
Make sure the polarities are in the right position when inserting the batteries into the application. When using 3 or more batteries, the application may operate even though one of the batteries is improperly inserted but this may cause leakage, heat generation, explosion or fire.
5. If leaked liquid gets in the eyes, it can cause eye injury.
Wash the eye(s) with clean water and receive medical care immediately.
6. If leaked liquid gets into the mouth, rinse the mouth well and consult with a doctor immediately.
7. Do not short-circuit.
If the positive \oplus and negative \ominus terminals come into contact with metal objects, short circuit occurs and excessive current flows at once resulting in leakage, heat generation, explosion or fire. When carrying or storing the batteries, avoid direct contact with metal objects such as bracelets or key chains by putting them in a separate container.
8. In case of leakage or a strange smell, move the battery away from possible sources of fire immediately.
Leaked electrolyte may catch fire.
9. Do not solder directly on the battery.
Doing so may damage insulation, which can lead to leakage, heat generation, explosion or fire.
10. Do not scratch nor peel off the resin film on the surface of the battery.
The battery surface is covered with thin vinyl film to prevent short-circuit. Cutting with an edged tool or peeling off this film may cause short-circuit, resulting in leakage, heat generation, explosion or fire.
11. Do not apply strong pressure to the batteries or handle roughly.
Doing so may cause leakage, heat generation, explosion or fire. Do not use a dropped battery as it may have been damaged.
12. Do not deform the battery in any way.
Doing so may damage insulation or gas release vent resulting in leakage, heat generation, explosion or fire.
13. Make sure to insulate battery terminals with vinyl tape when disposing of or storing them to avoid short circuit.
Putting batteries together disorderly or in contact with metal objects may cause short-circuit, resulting in leakage, heat generation, explosion or fire.
14. Do not use new and used batteries together. Do not use different types of batteries together.
Difference in their characteristics may cause leakage, heat generation, explosion or fire.
15. Do not force-discharge.
When a battery is forced to discharge by an external power source, the voltage drops to 0 or below (voltage reversal) and gas is generated inside the battery. This may cause leakage, heat generation, explosion or fire.

⚠CAUTION

1. Do not use or leave the batteries exposed to heat such as a front of window in direct sunlight or inside a car under sunlight.
Doing so may cause leakage, heat generation, explosion or fire.
2. Avoid contact with water.
Doing so may cause leakage, heat generation, explosion or fire.
3. Read the application's instruction manual and precautions carefully before use.
The specifications or performance of these batteries may not match some usages or types of application.
4. Remove batteries from the application if you do not use it for a long time.
5. Store and use the batteries away from direct sunlight, high temperature and high humidity.
Otherwise, it can lead to leakage, heat generation, explosion or fire. If stored or used in such environment, batteries may suffer from deteriorated performance and life.
6. Do not use the batteries if you notice heat generation, deformation or other abnormal situations while using or storing them.
It can lead to leakage, heat generation or explosion.
7. Check batteries inside emergency-use applications periodically.
Applications may not work properly in emergency due to batteries' deterioration, or may be damaged by leakage.
8. For proper disposal of batteries, refer to local regulations.

Requests Regarding Quality Assurance and Ensuring Safety

When considering the following please contact FDK beforehand to ensure quality and safety standards:

- ① Connecting batteries in series or in parallel on circuits.
- ② Molding batteries with resin.
- ③ Welding terminals onto batteries.
- ④ Cleaning or welding by means of ultrasonic.
- ⑤ Setting the battery life for your application.
- ⑥ Using the batteries for medical devices.
- ⑦ Using other power supply on the same circuit with thin-, coin- and cylindrical-type primary lithium batteries.
- ⑧ Using contact method such as battery holder for thin- and cylindrical-type primary lithium batteries and coin- type rechargeable lithium batteries.

Connection Terminal Specification

Each model is available with connectors, tabs, etc. which facilitate battery installation process onto user applications. Our standard connection terminal specifications are described in a separate document "Connection Terminal Specifications for Lithium Batteries and Key Circuit Design". Please consult with FDK for details.

Ni-MH Battery	Lithium Battery	Alkaline Battery		
High Durability for In-Vehicle Applications	Cylindrical-type - Primary Lithium Batteries - High Power - Primary Lithium Batteries - High Capacity	Premium	Japanese	
High Durability		High Power	Web catalog	
High-Rate Discharge	Thin-type	Universal Power	Inquiry	
Standard	Coin-type - Primary Lithium Batteries - Rechargeable Lithium Batteries	Environment		
Dry Cell Compatible	Environment Precaution	Precaution		
Battery Pack, Battery System	Transport Dimensions	SDS		
Charger	SDS UL			
Precaution				
Transport SDS				

FDK

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