

# BATTERY PACKS

## Purpose of battery packs

Ni-Cd cells are most commonly used in battery packs. In using Ni-Cd batteries, the type of battery, the number of cells, the shape of the battery pack, and the components of the battery pack will be determined by the ratings (voltage and load current) of the device, the charging

specifications, the amount of space available inside the device, and the usage conditions.

After consultation concerning specifications, if so desired, Panasonic can also provide assembly services for battery packs.

## Configurations of tube battery packs

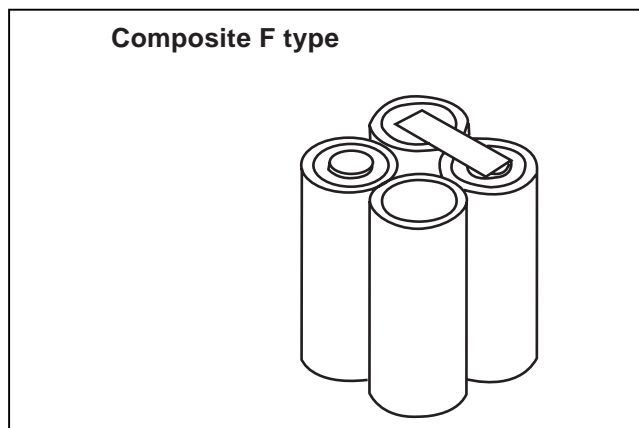
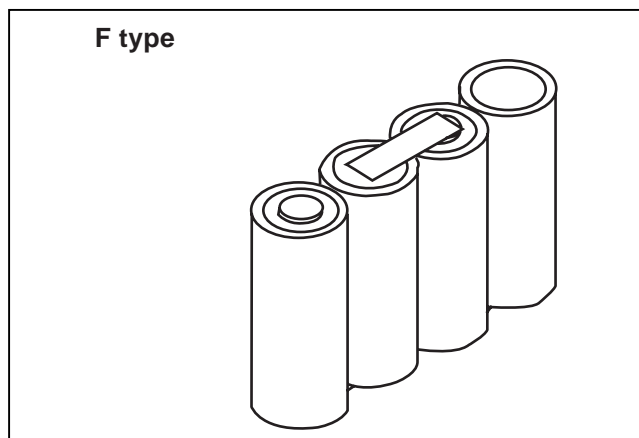
The following are the standard pack configurations for Ni-Cd batteries. Refer to these configurations when designing the battery pack.

### (1) F type

The required number of single cells are lined up in the radial direction of the cells and connected by nickel plates, and covered with an external heat-shrink PVC tube.

#### Composite F type

Single cells are connected in 2 to 5 rows, and then packed in a heat-shrink PVC tube.

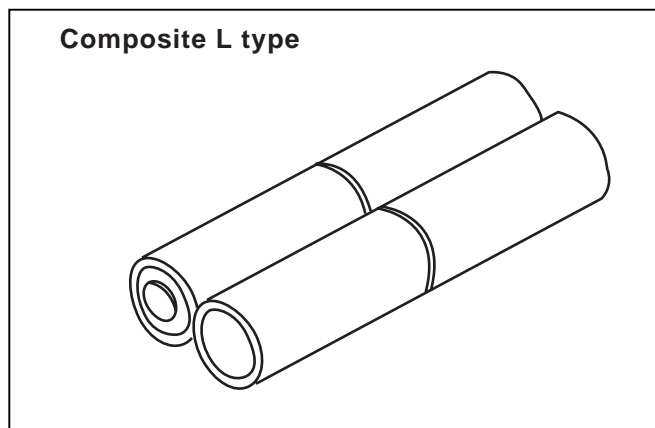
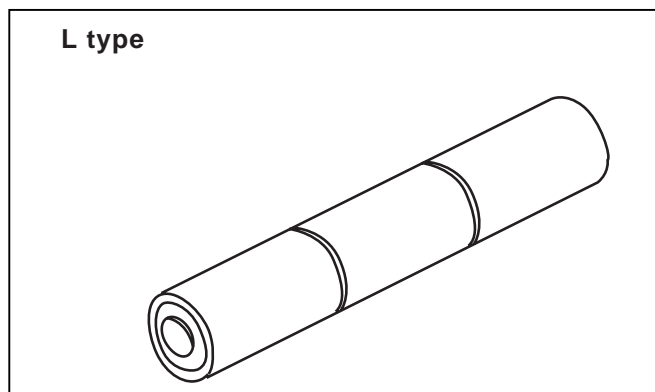


### (2) L type

The required number of single cells are lined up in the axial direction of the batteries and connected by nickel plates, and covered with an external heat-shrink PVC tube.

#### Composite L type

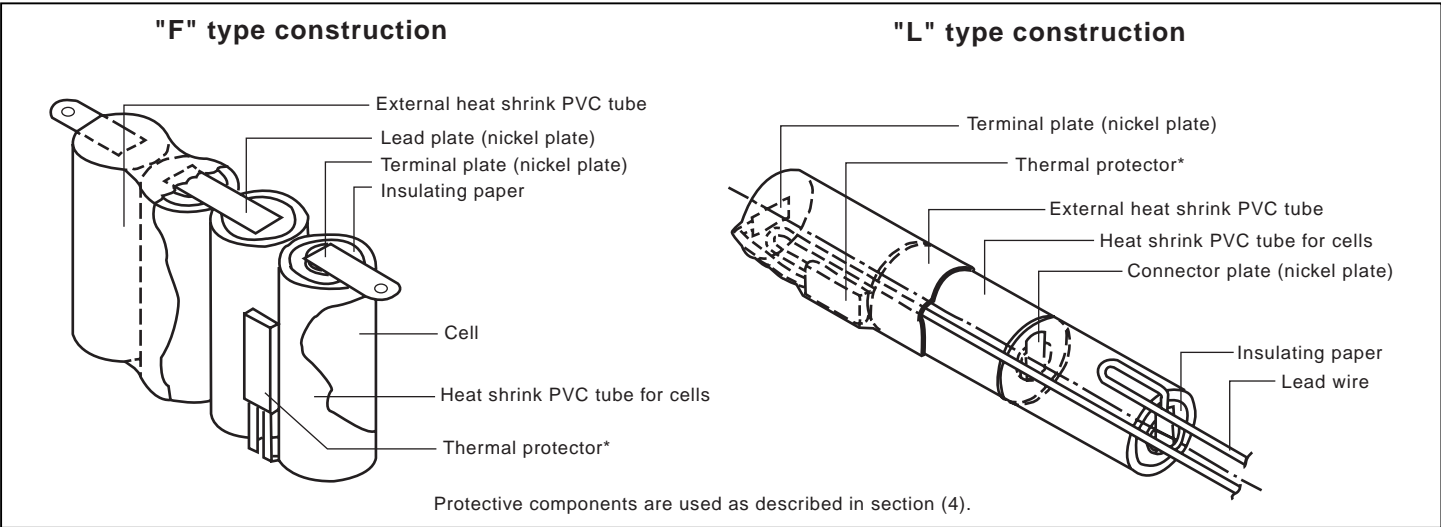
Groups of single cells connected in an L type configuration are further connected in 2 to 5 rows, and then packed in a heat-shrink PVC tube.



# BATTERY PACKS - CONTINUED

## Construction of battery packs

The basic constructions for battery packs are as shown below.



## Special battery pack configurations

Custom specifications (battery packs in plastic cases, etc.) can also be prepared upon request. Consult Panasonic for details.

Also feel free to consult Panasonic's Design Department concerning specifications and production schedules.

### (1) Batteries in injection-molded plastic cases

It is important to take into consideration the lead time required for the preparation of production molds and the procurement of custom parts.

### (2) Battery packs with built-in charge level indicators and charging systems

If so desired, Panasonic can also provide technological assistance concerning battery packs with a built-in charge level indicator or a built-in charging system.

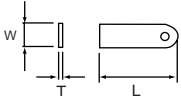
## Parts for battery packs

### (1) Terminal plates

Because the lead wires are soldered to the terminal plates, the terminal plates must be made of a material that has good solderability, that can be securely spot-

welded to the cells, and that is highly electroconductive and alkaline-resistant. The most common material used is high-quality nickel plate.

### Recommended terminal plate dimensions (Material: Nickel)

No.	Dimensions (mm)			Applicable battery size	Configuration
	T	W	L		
1	0.15	4	15	AA size and smaller	
2	0.15	4	15	A size	
3	0.15	5	20	SC size	
4	0.15	5	25	C size	
5	0.15	7	30	D size and larger	

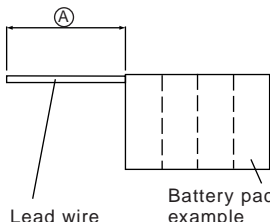
## BATTERY PACKS - CONTINUED

### (2) Lead wires

To connect the batteries to the device, vinyl-clad electrical wire for heat-resistant device wiring conforming to UL-1007 is generally used. Red for the

positive side and black for the negative side are the standard colors. The ends of the lead wires may be bare cut ends or connected to connectors, etc.

### Standard lead wires

Applicable battery size	Lead wires			Reference diagram
	Size	Length (A) (mm)	Color	
AA size and smaller	UL1007 AWG24	approx. 200	+ Red	
			- Black	
A size	UL1007 AWG22	approx. 200	+ Red	
			- Black	
SC size	UL1007 AWG20	approx. 200	+ Red	
			- Black	
C size	UL1007 AWG20	approx. 300	+ Red	
			- Black	
D size and larger	UL1007 AWG18	approx. 300	+ Red	
			- Black	

### (3) Heat-shrink PVC tube

Heat-shrink tubes made of polyvinylchloride are used on many packs as the external cover. Tube thickness ranges from 0.1 mm to 0.2 mm depending on battery type and configuration.

### (4) Protective components

Thermal protectors to prevent overcharge and overheat, PTC elements, temperature fuses, current fuses, and other protective components, either singly or in combinations, are connected via a direct-line circuit to the batteries. Upon request, Panasonic can provide the necessary components for protecting both the battery pack and the device in which it is used.

### (5) Others

Depending on the configuration of the battery pack, adhesive materials, tape, paper cylinders, or other parts or materials may be used. If so desired, temperature sensors for charge control and other electronic components can be installed inside the battery pack.