



# Lithium Ion & NiMH Battery Packs for Notebook Computers



# Li-ion & NiMH Battery Packs

## Go for the *Smart*

GP Smart rechargeable batteries incorporate an innovative integrated circuit that monitors the power system, generating data on power usage, battery status and battery charging.

Design the smart feature into your portable computer to differentiate your product from the competition by offering advanced power management features that increase run time and enhance reliability and ease of use.

## Major Features of Li-ion Batteries

### High Energy Density

Greater than 300 Wh/L and 150 Wh/kg; about 25% better than NiMH and 50% better than NiCd.

### High Voltage

Voltage per cell is 3.7 volt, 3 times that of NiMH batteries. It allows a simpler battery configuration and better space utilization for low cell voltages.

### Superior Cycle Life Performance

Can exceed 300 cycles at 1C and achieve over 500 cycles at 0.2C.

### Superior Low Temperature Performance

All models can work at temperatures as low as -20°C. Some models can even work at -30°C.

### Superior High Temperature Storage Performance

Loss of capacity is only 3% after storage at 60°C for 1 week at 0.2C discharge rate, or 4% at 1C discharge rate. This is essential for notebook computers as they run at high temperature.

### Fast Charge Rate

Can be 80% charged in one hour and fully charged in 2.5 hours.

### High Drain Rate

Can be used up to 2C drain rate.

### Flat Discharge Characteristics

Graphite type negative electrode has steady discharge voltage essential for electronic equipment.

### Reliable Safety Design

Designed and built with internal safety features to resist physical abuse and to prevent overcharge and over current.

### Environmentally Friendlier

Contain no toxic heavy metals such as mercury, cadmium or lead.

### Low Self Discharge Rate

### Low Internal Resistance

### No Memory Effect



## Lithium Ion 18650

The heart of GP Smart Li-ion Battery Pack is the highest capacity GP Li-ion 18650 battery, the Milestone Cell of 2100mAh first launched by GP Batteries. Its ultra-high performance makes it the most logical power force for advanced portable devices.

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On-pack fuel gauge displays accurate indication of capacity remaining while the chip inside provides battery-related information to the computer.

## GP Smart Features

### Ultra-low power consumption

Draws less than 1 mA when active and 3µA when asleep, resulting in shelf life of up to two years.

### Capacity learning algorithms

Measures and communicates full charge capacity over battery life.

### High-precision circuitry

Better than 8000 to 1 dynamic range. Doesn't miss high current pulses or low sleep currents.

### Smart battery data

Support both SMBus 1.0 and 1.1a. OEMs can enable innovative GUIs to differentiate their products.



## GP Smart Communications Protocol

GP Smart rechargeable batteries are built on open standard that will protect your investment in product design and power-related software. These standards can easily be adopted to new and emerging battery technologies, allowing you to deliver your state-of-the-art products to market faster.

### Multiple Sourcing

Employing the smart function allows multiple sourcing of batteries irrespective of the subtle differences in battery characteristics.

### Multiple Chemistry

Different types of battery chemistry can be used interchangeably.

### Standardized Power Management Software

Support of the technology by the O/S through ACPI, simplifies power management software development.

GP's open system specifications are widely adopted by a number of leading software and component suppliers including the System Management Bus (SMBus) and Smart Battery Data (SBD).

\*SMBus is a serial bus that provides the pathway for the battery to communicate with other components in the computer.

\*SBD is a specification that defines the information accessible across the SMBus from 34 data points in the battery integrated circuit.

GP also employs an advanced interconnect which is a self securing battery interconnection system that provides viable direction mating and voltage/form factor polarization for safe, consumer-friendly operation.

## Specifications

Model	Type	Size	Voltage (V)	Capacity (mAh)	Dimension L x W x H (mm)	Weight (g)
<b>With Smart Chips</b>						
DR201	Li-ion	9 x 17670	11.1	3900	215.8 x 53.0 x 19.3	385
DR202	Li-ion	9 x 18650	11.1	5400/6300	149.5 x 89.3 x 20.0	450
DR211	Li-ion	9 x 18650	11.1	6300	215.4 x 59.8 x 22.9	550
DR218	Li-ion	9 x 18650	11.1	6300	212.6 x 57.5 x 21.2	420
DR15S	NiMH	9 x 4/5A	10.8	2100	145.0 x 52.8 x 19.3	305
DR35S	NiMH	9 x 4/3A	10.8	3800	215.0 x 52.8 x 19.3	505
DR36S	NiMH	10 x 4/3A	12	3700	149.0 x 89.0 x 19.7	590
B905S	NiMH	10 x 4/3A	12	3800	149.5 x 89.3 x 20.0	585

Model	Type	Size	Voltage (V)	Capacity (mAh)	Dimension L x W x H (mm)	Weight (g)
<b>Without Smart Chips</b>						
DR17	NiMH	6 x 4/5A	7.2	2100	145.0 x 35.8 x 18.3	220
DR30	NiMH	6 x 4/3A	7.2	3800	113.0 x 71.0 x 18.3	350
DR31	NiMH	9 x 4/3A	10.8	3700	209.0 x 52.5 x 18.5	465
DR35	NiMH	9 x 4/3A	10.8	3800	215.0 x 52.8 x 19.3	500
DR36	NiMH	10 x 4/3A	12	3700	149.0 x 89.0 x 19.7	590
B905	NiMH	10 x 4/3A	12	3800	149.5 x 89.3 x 20.0	585

## GP Smart Power Control Panel

## GP Standard-Sized Batteries Built in a *Smart* Way

GP standard-sized rechargeable batteries will save you heavy investment in battery related engineering, inventory and after sales service.

### Lower up-front design and product life cycle costs

GP standard-sized batteries and design-in assistance eliminate customized power sources, interconnects and chargers, reducing engineering costs and shortening time to market.

### Design flexibility

Available in sizes to match your energy requirements, from handheld computers to high performance notebooks.

### Reduced inventory exposure

Standard sizes minimise inventory requirements and avoid product obsolescence.

## Retailers' Preference

Retailers will also benefit from GP's standard-sized batteries with

- Fewer SKUs
- Reduced consumer confusion
- Easy & unassisted sales

## Work Effectively with GP Smart Batteries

- Up to 20% longer run time than batteries without smarts
- Greater value in a compact size - Cost competitive and equal in size to batteries without smarts
- Accurate fuel gauge indicator on screen/on battery
- Predictable run time forecast - indicates remaining capacity and run time within an estimated 1%
- Replacement convenience through GP worldwide distribution

## Guarantee

GP computer packs have been tested by the industry and UL listed to guarantee the performance as specified. Every GP computer pack is fully guaranteed against defects in material and workmanship.



# Safety Precautions

Please follow the safety precautions carefully as improper handling of rechargeable batteries may result in injury or damage from electrolyte leakage, heating ignition or explosion. To ensure safety, consult with GP regarding the charge and discharge specifications, equipment structure, warning labels and other important details when designing equipment to use GP rechargeable batteries.

- Do not dismantle or modify the battery.
- Do not charge the Li-ion battery above 4.20V.
- Do not reverse charge the battery.
- Do not heat or incinerate the battery.
- Do not pierce, crush or cause mechanical damage to the battery.
- Do not charge a battery at high temperature condition, such as at or near a fire.
- Do not short circuit the battery.
- Do not discharge a battery to below 2.8V per cell for Li-ion models.
- Do not allow the battery to get wet or be immersed in water.
- Do not strike or throw the battery.
- For long period of storage, temperature should be below 45°C for Li-ion and 35°C for NiMH.
- After long period of storage, battery may require some cycling to recover capacity.



# GP Batteries

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