

**HIGH PERFORMANCE, LONG LASTING, SAFE BATTERIES FOR TOUGH, CRITICAL APPLICATIONS**

NEC Energy Solutions ALM™ family of lithium-ion batteries offers exceptional performance and long operating life.

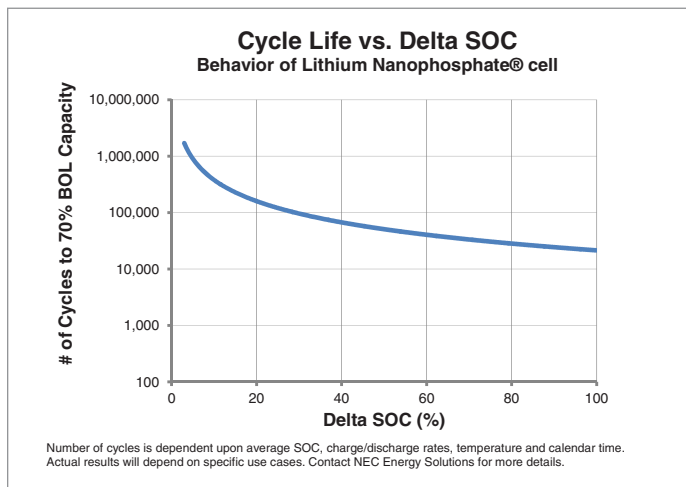
The ALM 12V35 delivers significant advantages over lead-acid batteries:

- High energy capacity even under high discharge rate and deep cycling
- Industry-leading service life in both cycling and float applications
- Integrated, redundant safety protection circuits

ALM 12V35 vs. Typical Lead-Acid Equivalent	
Available Energy (at 1hr rate)	<b>Up to 60% greater</b>
Cycle Life (to 50% DOD)	<b>10–50X longer</b>
Calendar/Float Life	<b>Up to 5X longer</b>
Charging Time	<b>10–100X faster</b>
Weight (Kg)	<b>50% lighter</b>

**Long Life**

- Exceptional 100% deep discharge cycle life
- Superior float, calendar, and shelf life
- Excellent partial state-of-charge endurance



**High Performance**

- High rate power delivery with consistent energy capacity
- Fast, simple charging. Compatible with most lead acid chargers
- Integrated intelligence and communications (ALM i-Series)
- Scalable arrays up to 48V, 350Ah (4S10P) without external Battery Monitoring System (BMS)



**Robust Safety**

- EverSafe™ battery technology. Protection at the cell, battery, and system level
- Fast response short circuit protection
- Safe, proven, high-performance Nanophosphate® LiFePO4 chemistry
- Sealed ABS plastic case (UL 94-5VA flame retardant)
- Environmentally friendly; cells contain no lead or cadmium

**Tough, Critical Applications**

- Strong performance and long life across temperature extremes
- Light weight with superior energy density
- Simple, scalable system configurability up to 18kWh of energy



**UPS SYSTEMS**

**TELECOM BACKUP POWER**



**PV SOLAR-STORAGE**

**OFF-GRID POWER**



**ELECTRIC MOBILITY**

**MEDICAL EQUIPMENT**



The ALM12V35 is available in standard (s), intelligent (i), and High Power (HP) series to match application requirements. The i-Series offer integrated CAN or SMBus communications for access to critical battery status, usage tracking, State of Charge (SOC), run time to empty, and other parameters.

Electrical Characteristics at 25°C	12V35s	12V35i HP
Nominal Voltage	13.2 V	
Nominal Capacity <sup>1</sup>	35 Ah	
Available Energy (BOL)	462 Wh	
Max. Charge/Discharge Current Pulse (1 sec)	250 A	
Max. Inrush Current Charge or Discharge (0.3s)	500 A	
Max. Continuous Discharge Current (to 100% Depth of Discharge)	105 A <sup>4</sup>	210 A <sup>4</sup>
Max. Continuous Charge Current	105 A <sup>4</sup>	210 A <sup>4</sup>
Max. Recommended Charge Voltage	14.4 V	
Max. Charger Voltage (w/o damage)	60 V	
Recommended Float Voltage	13.6 - 14.4 V	
Charge time @ max rate	20 min. @ 3C	10 min. @ 6C
Min. Float Voltage	13.6 V	
Under-voltage Limit (min)	8 V	
Operating Temperature <sup>5</sup>	-40 to +60°C	
Recommended Storage Temperature <sup>2</sup>	-40 to +35°C	
Transportation <sup>3</sup>	-40 to +80°C	

1. Minimum Capacity – 33.6 Ah at beginning of life (BOL)
2. Storage at higher temperature reduces the battery's life
3. Transportation up to two weeks
4. Duration of maximum constant current is thermally limited by internal electronics and depends on ambient temperature.
5. Charge and discharge power, and energy availability, will be limited at the low and high ends of the specified operating temperature range.

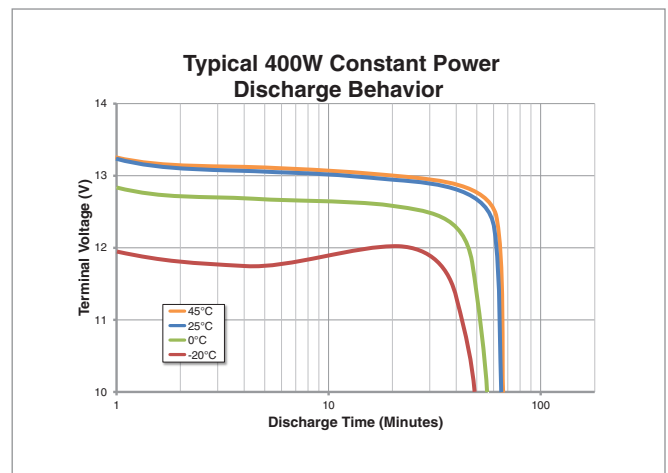
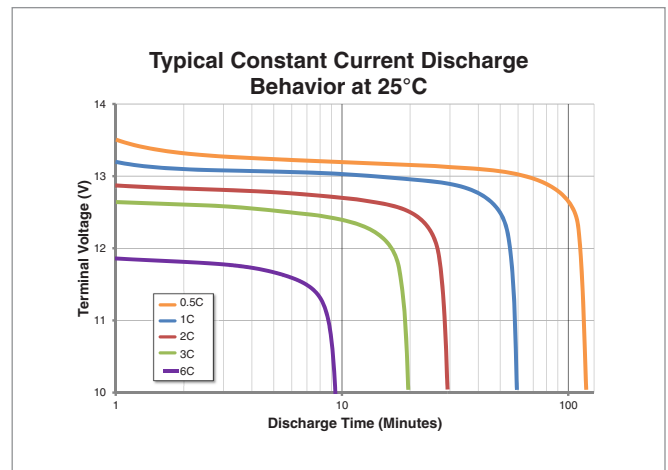
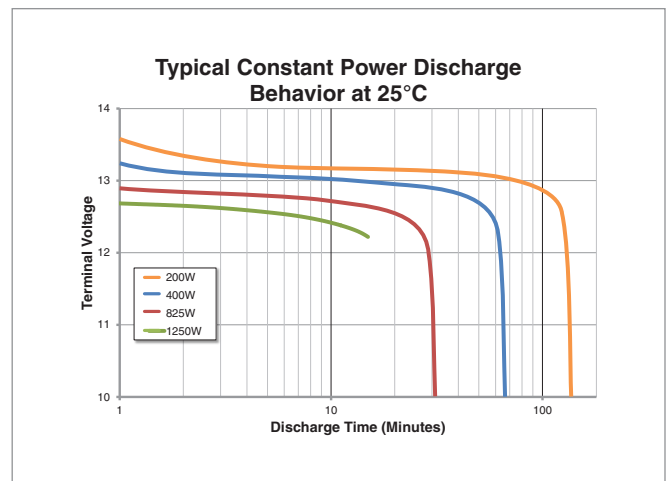
## SAFETY AND COMPLIANCE

IEC62133; UL 1973

REACH, RoHS and Battery Directive (2006/66/EC)

Meets FCC 47CFR 15 Class B, IEC61000-6-1,-2, -3, -4, ICES-003

UN Manual of Tests and Criteria Part III



Constant Power Discharge Characteristics in Watts @ 25°C	End Voltage	30 min	45 min	60 min	90 min	120 min	180 min	240 min
	10V	886	598	456	305	231	156	118

Constant Power Discharge Characteristics in Amps @ 25°C	End Voltage	20 min	30 min	45 min	60 min	90 min	120 min	240 min
	10V	105	69	46	35	23	18	9

## TELECOMMUNICATIONS POWER SYSTEMS

Communications gear, whether in public or private networks, must meet critical up-time requirements, despite being deployed in harsh and difficult to access locations. The ALM 12V35 dramatically exceed the performance and life expectations of traditional back-up power solutions, whether in stable, weak, or off-grid environments. ALM 12V35 is ideal for:

- Base stations, Small cells, outside plant OSP equipment, Distributed Antenna Systems (DAS)
- Private wireless, Microwave systems, Central office power back-up

## OFF-GRID OR WEAK-GRID POWER SYSTEMS

Off-grid power systems demand fast and frequent charge and discharge cycles, often in harsh environments with portability requirements. The ALM 12V35's long cycle life, fast charging, and light weight are ideal for these challenging applications:

- Oil / gas / mining, remote sensors, electronic road signs, lighting

## UPS SYSTEMS

Uninterruptible Power Supplies are ubiquitous not only in data centers and small offices, but also in a broad array of industrial applications – anywhere where computers are used in critical applications. The exceptional power delivery capabilities, long life, and light weight ALM 12V35 enable UPS systems including:

- Industrial Automation, Data Center, Server UPS

## INTEGRATED PV SOLAR-STORAGE SYSTEMS

Advanced battery systems promise to extend the utility of the solar PV systems experiencing rapid global adoption. In residential and small commercial environments with unreliable electric grids, high performance batteries are critical components. The fast charging and long life ability of ALM 12V35 – even in frequent partial state-of-charge scenarios – are key to effective PV+storage applications including:

- Remote sites, Residential PV with weak-grid systems, Small Commercial back-up

## MEDICAL EQUIPMENT

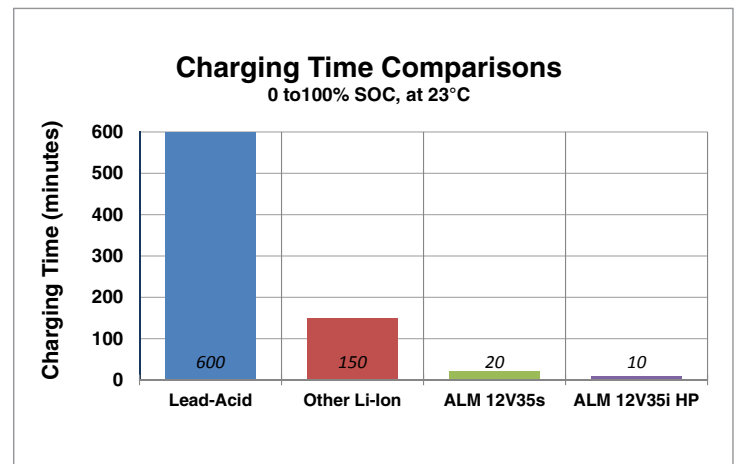
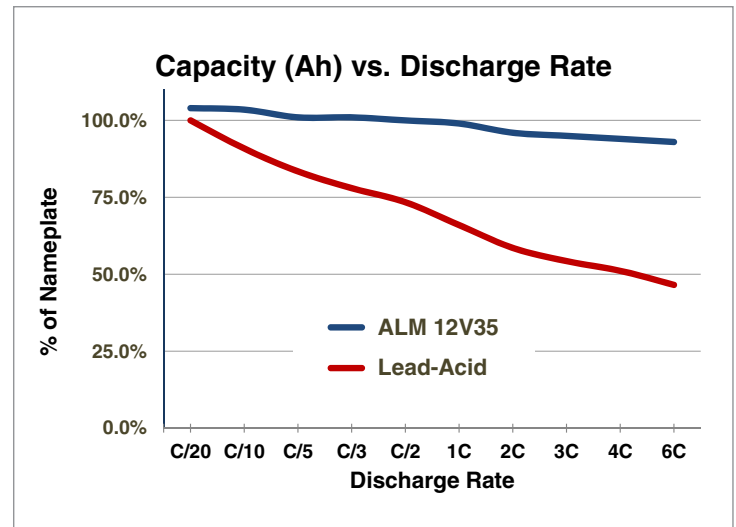
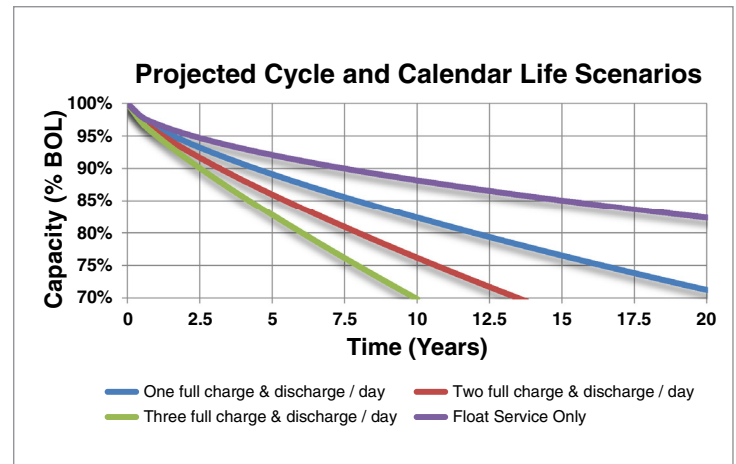
Medical equipment increasingly relies on advanced batteries for operational portability. However, sidelining equipment for hours to accommodate battery charging or frequent servicing directly impacts the cost and quality of patient care. The fast recharging and long operating life of the ALM 12V35 maximizes the value for:

- Mobile Carts, Diagnostic Equipment

## ELECTRIC MOBILITY

Mobility assistance systems for disabled persons energy storage that delivers consistent high power when needed, light weight and fast recharging. NEC Energy ALM batteries significantly outperform lead-acid batteries in these applications, including:

- Wheelchairs, Disability Scooters



## ALM 12V35 (i-SERIES) INTELLIGENT BATTERIES

The intelligent ALM 12V35i batteries allow unprecedented monitoring and control of battery systems, eliminating the need for external sensors and monitoring systems. Each ALM 12V35i maintains detailed information on battery and cell-level operation, including:

- Battery voltage and current
- Relative State of Charge (SOC)
- Cell voltage and temperatures
- Full charge and remaining capacity
- Cycle count

In addition, each ALM 12V35i allows user programmable thresholds and alarms for capacity, remaining time, under and over-voltage warnings, and temperature warnings. Battery activity, including time at different temperatures, is logged and available to the user. NEC Energy offers a Windows-based graphical software application for demonstrating the ALM 12V35i's capabilities.

The ALM 12V35i's management functions are accessible through CAN Bus or SMBus interfaces. The CAN Bus interface allows 40 or more batteries to be daisy-chained into one link, and may be connected to a wide variety of smart power system controllers used in telecommunications and other industrial power systems. The SMBus interface allows up to 8 daisy-chained batteries and is specifically designed for medical cart and UPS systems.



## PHYSICAL AND MECHANICAL SPECIFICATIONS

Specification	Description
Dimensions (excluding terminals)	197 x 132 x 179.5 mm (7.8 x 5.2 x 7.1 in)
Weight (approximate)	6.3 kg (13.8 lbs)
Case Material	ABS Plastic, UL 94 5VA Flame Rating
Terminal Bolt Requirements	Stainless Grade A4-70, M6 x 1.0 mm x 16 mm, torque up to 62in-lbs (7N-m)
Communications Connectors (if equipped)	9-pin D-sub

## ORDERING INFORMATION

Product Model	Description	Regulatory Model Number	Order Number
ALM 12V35s	Standard, Base Power	PSL000002	ALM000001-01
ALM 12V35i HP CAN Bus	Intelligent, CAN bus, High Power	PSL000003	ALM000005-01
ALM 12V35i HP SMBus	Intelligent, SMBus, High Power	PLS000003	ALM000006-01



**NEC Energy Solutions, Inc.**  
155 Flanders Road  
Westborough, MA 01581

(508) 497-7319  
[www.neces.com](http://www.neces.com)

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