



Saft power systems

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Saft power systems



Putting the

“U”

in “UPS”

...and keeping it there



With several types of UPS systems available to the market today, which type of UPS is ideal for all applications?



The one that works, when it's needed.

Types of UPS systems

Advantages

Disadvantages

Off-Line

- Inexpensive to purchase
- Good overload

- Inefficient
- Loss of loads
- Battery consumption

•Line-Interactive

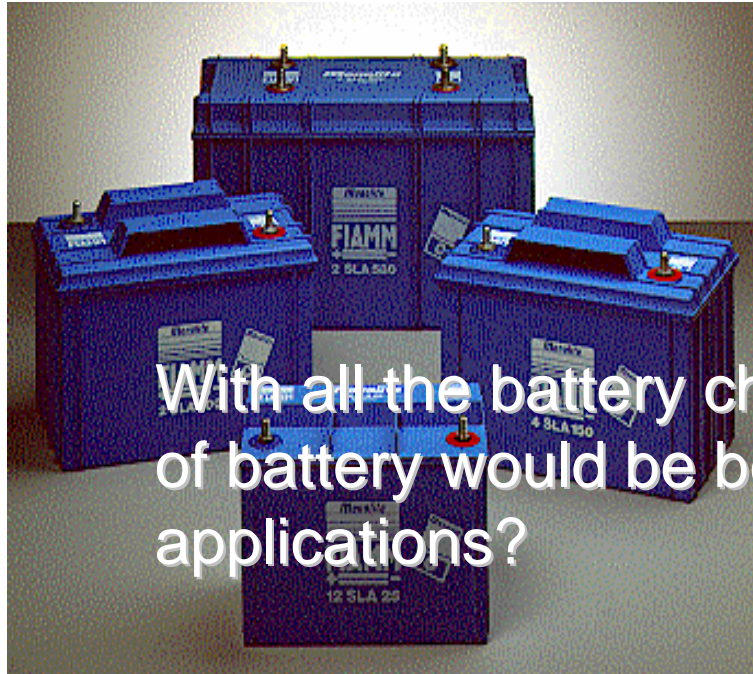
- Not expensive to purchase
- Battery always being charged

- Limited frequency regulation
- No power factor correction

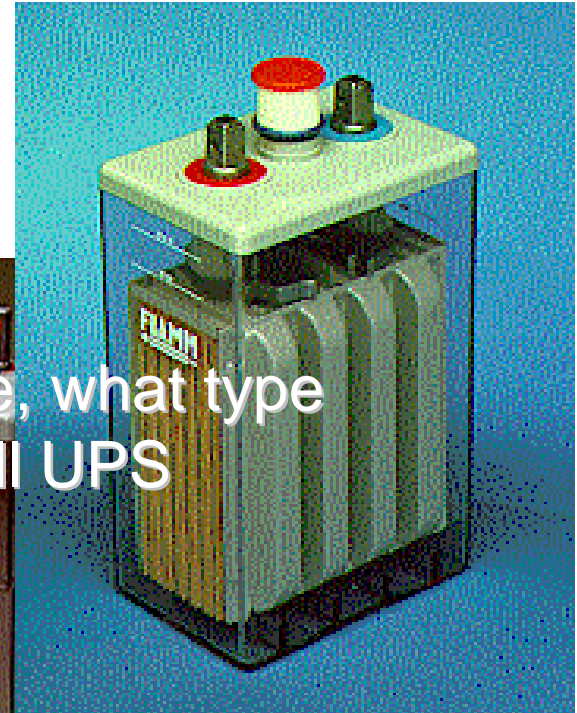
•On-Line

- Battery consumption
- High efficiency

- More expensive to purchase



With all the battery choices available, what type of battery would be best suited for all UPS applications?





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Answer

The one that works when it's needed.



When a typical RFQ does not specifically name a battery manufacturer, chemistry type or design life, what battery is likely to be offered?



Maybe NOT the one that will necessarily work when it's needed, but rather the least expensive one*.

*Usually by a UPS manufacturer or when system-selling.

Types of Batteries for UPS



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- Flooded Lead Acid
- Valve Regulated Lead Acid
- Flooded Nickel Cadmium



Block or Single Cell?

Most all batteries are available in either single cell or block format.

Which to choose?

	<u>Block</u>	<u>Single Cell</u>
Advantages	<ul style="list-style-type: none">-Initial cost-Fewer connections	<ul style="list-style-type: none">-Ease of cell replacement-Reliability-Allows for bad cell removal
Disadvantages	<ul style="list-style-type: none">-Expense of block replacement-Voltage/block	<ul style="list-style-type: none">-Increased maintenance costs-Initial cost



Discharge Characteristics of Battery

<u>System Type</u>	<u>Requirement</u>	<u>Duration</u>	<u>Plate Type</u>
Switchgear	-Low/High current -Long time	2-8 hours	Medium (M)
Telecom	-Low current -Long time	8 hour +	Thick (L)
UPS	-High current -Short time	< 1 hour	Thin (H)



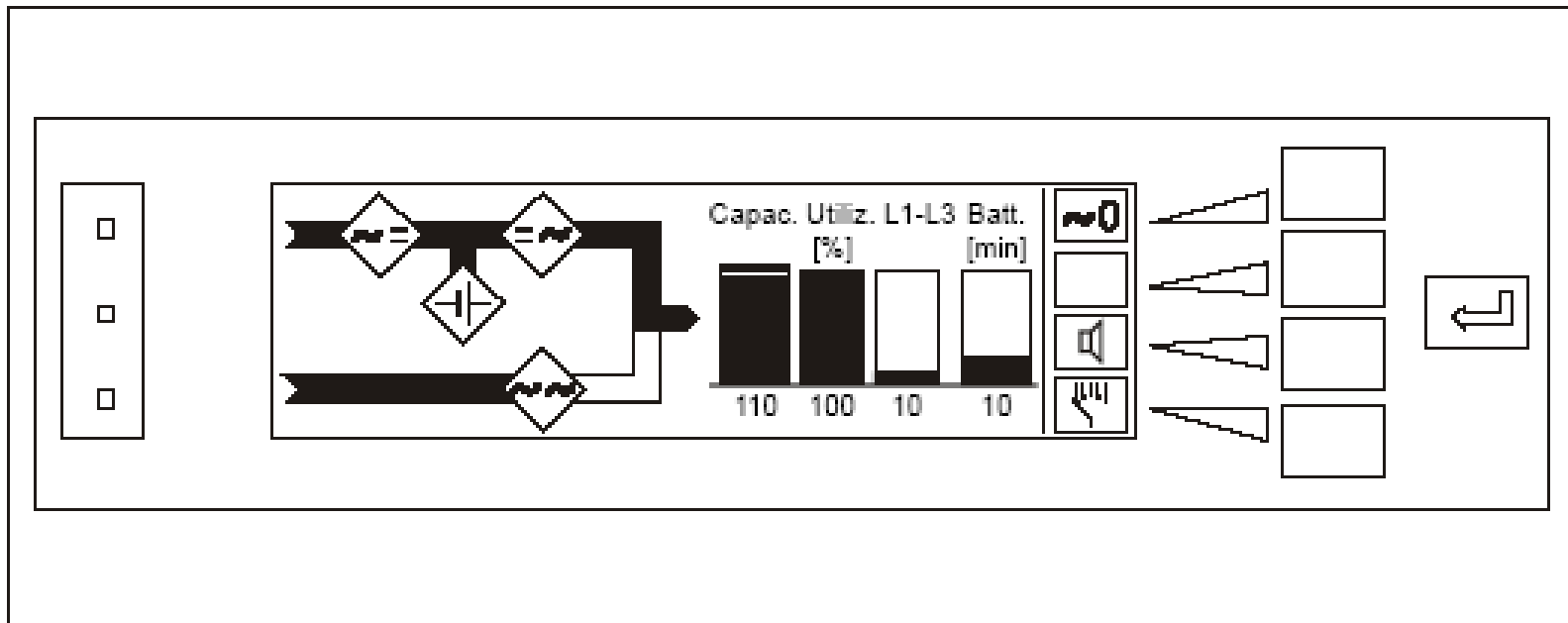
What can a UPS do for a battery?

- **Test of “Battery Charging Circuit”**
 - Automatically each week- duration 1 sec.

- **Capacity Check**
 - check of battery with constant current from battery
(Batt. Volt. / Batt current / test duration / capacity drawn from Batt.)

- **Capacity Test**
 - check of battery with available inverter load
(Batt. Volt. / Batt current / test duration / capacity drawn from Batt.)

Standard LCD display on UPS





Standard UPS set up options

Battery Values

Depending on the system configuration, different battery parameters can be set within predefined ranges in the "Battery values" menu of the Service menu. The individual values to be set must be taken from the data sheets of the battery manufacturer.

List of all available parameters and their adjustment ranges:

Type	Pb	NiCd
(Number of) cells	180 - 204	282 - 320
Cap(acity)	0 - 9999 Ah	
U Tri/cell	2.13 - 2.32 V/cell	1.33 - 1.50 V/cell
U Cha/cell	2.23 - 2.43 V/cell	1.37 - 1.70 V/cell
U Equ/cell	2.23 - 2.58 V/cell	1.37 - 1.75 V/cell
U EPS/cell	1.90 - 2.32 V/cell	1.10 - 1.50 V/cell
U Sta/cell	1.00 - 2.86 V/cell	0.50 - 1.95 V/cell
I (bat) limit(ation)	1 - 110 % of Inom	
I Tri/Cha/Equ		
I (bat) limit(ation) Sta	1 - 110 % of Inom	
(Charging) time Equ	1 - 1999 min	
(Charging) time Sta	1 - 1999 min	
Final disch. voltage/cell	1.6 - 2.0 V/cell	0.65 - 1.20 V/cell
(max. bat. test) time	1 - 1200 min	
Disch. current [%] of xA	5 - 90 % of Inom	



The task of BLÜ-PRO battery charging circuit monitoring is to monitor the correct operating status of a battery in conjunction with the charger of a UPS.

Monitoring covers the following faults:

- Failure of one or both battery fuses
- Breakage of one or more cell connectors
- Breakage of one or more battery cells
- Break of the charging cables or the cables to BLÜ-PRO
- Battery faults leading to a voltage asymmetry

Battery Sizing Comparison

Especially important when replacing batteries.

▶ 25°C:

IEEE 485 – Pasted plate	80 Ah
IEEE 485 – Planté-pure lead	62 Ah
IEEE 1115 – H Plate Ni-Cd	32 Ah

▶ -10°C:

IEEE 485 – Pasted plate	132 Ah
IEEE 485 – Planté pure lead	101 Ah
IEEE 1115 – H plate Ni-Cd	37 Ah



Other considerations when replacing batteries

- If keeping same chemistry, but changing manufacturers:
 - Any float voltage changes required?
 - Can I keep the same rack?
 - Do I need to tell the UPS of the change?

- If changing battery chemistry:
 - Any float voltage changes required?
 - Can I keep the same rack?
 - Do I need to add circuitry like filtering or temperature compensation probe



What does the Customer expect?

- A completely reliable system to protect their load.
- A system that will always be available when needed.



What the Customer should know

Information to help you choose the right battery.

- What is the current load?
- What is the future load?
- Is there a plan for orderly shutdown, in case of a power outage?
- What historical information is available on power outages for this site?
- Is there a generator in the planned system?
- What is the ambient temperature of the battery room?
- Does the site have any seismic requirements?



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Thank you for your attention.