

IBEX & iPQMS/BDS

are creating an innovative vision for emergency power / battery diagnosis & monitoring technologies.

- All-In-One Solution
- High Precision and Reliability
- Realizing the Highest Economy
- Precise Measuring Everywhere
- Meeting Customers' Needs
- Comprehensive diagnosis software and Reporting package



New Leader in Future Technology

POWERTRON
POWERTRON ENGINEERING CO., LTD.

www.powertron.co.kr



Introduction

IBEX is a cutting-edge digital Battery quality diagnostic tester by all IEEE Std. recommendations for all the stationary applications such as telecommunication's backup power, utility switching power, uninterruptible power systems (UPS), etc and can measure the accurate internal impedance (Z), voltage (V), temperature (°C) with the world's first ripple-removing algorithm (KR PAT No.0494489) within a short time (3 seconds or less) during floating charge.

Actually, we have provided them to Korea Telecom, SK Telecom, Korea Electric Power Corporation, Korea Railway Corporation and others with their utmost satisfaction and reliability of **IBEX** has been verified reliability verification tests of end-users, such as Korea Telecom Providers.

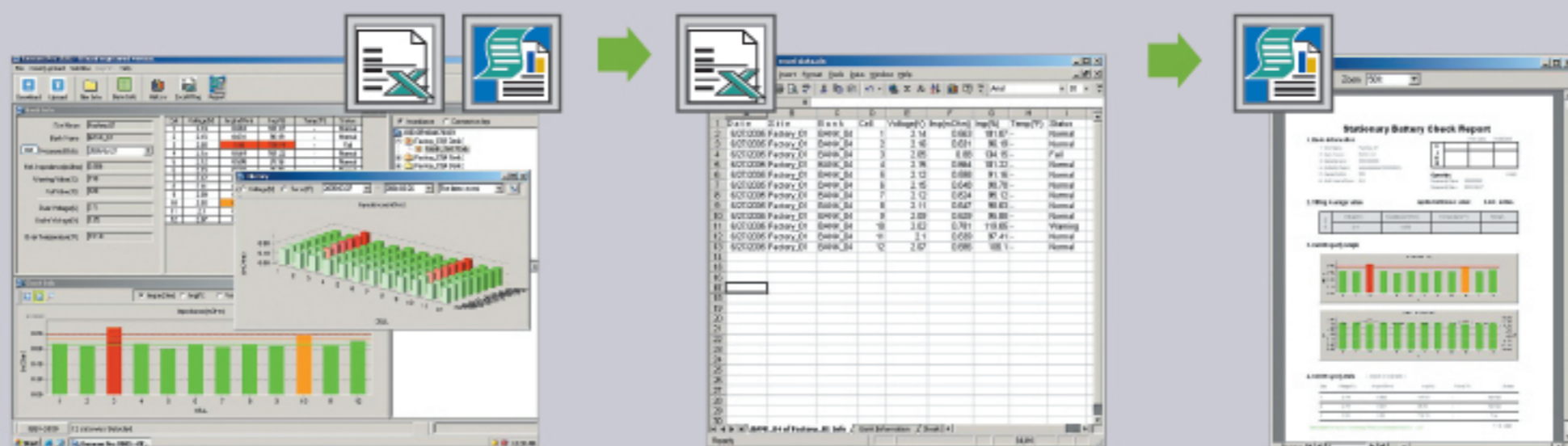
IBEX Advantages

- **IBEX** meets all IEEE Std. recommendations for all stationary battery systems.
- **IBEX** has a built-in type automatic measuring algorithm consisted of **Normal**(less than 3 seconds for measurement), **Fine** and **Automatic**, it automatically measures and stores data by contacting probes to the battery posts. Thus, it can measure a lot of cells in a short while.
- **IBEX** can manage the measuring data of batteries in 15 different types of bank strings and it enables effective data management, data transfer to PC and easy database operations.
- **IBEX** is the world's first compact and light weight tester(One-hand hold size), it is advantageous for on-road measurement.
- To make it more user friendly, most of its menu items are displayed in the form of icons so that even a beginner can use it without difficulty.
- Even when battery shorted with inside plates, **IBEX** enables to measure the battery cell that has lower value than 0.5V and also can measure its intercell resistance easily and instantly.
- **IBEX** uses a Li-ion battery to increase usage time(over 4 hours) and is marked by an enhanced durability with the elimination of moving part
- **IBEX** offers the most comprehensive diagnosis software(Exmons Pro 2005) and reporting package.



Exmons Pro 2005 Diagnosis Software

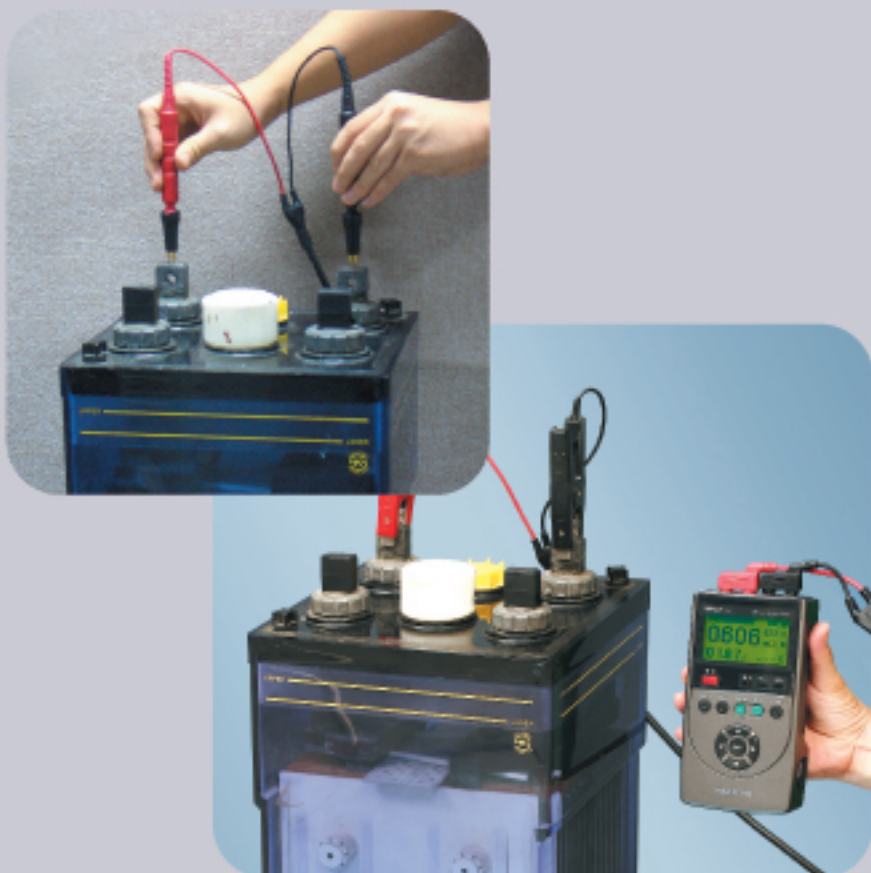
- **Exmons** is a comprehensive diagnosis software to ensure the integrity of your backup batteries and any power backup systems.
- By constructing database of the measuring data, it can be stored and managed as a site-specific tree structure in the PC.



- **Exmons** provides handy information such as a battery cell's deterioration displayed in a range of graphs as well as various screen menus, it allows users to analyze and determine the aging status of battery in a highly user-friendly environment.
- **Exmons** has a bank-specific report printout function, it frees users from the manual documentation and allows them to utilize the analysis outcomes.
- By saving the measuring data in excel file, **Exmons** facilitates documentation of the data.
- Trended battery measurement data can detect impending battery failures before power backup system is affected, with enough time in advance to replace the failing batteries.

IBEX out line view

IBEX ORIGINAL / PRO



Equipment and Accessories

MODEL	EQUIPMENT AND ACCESSORIES
IBEX-1000	IBEX-1000(main body), Soft Poly-Vinyl Bag(for storage or measurement), Charger(for Li-ion Battery Pack), Pin Probe(4-Point Pin type), Clip Probe, Temperature Probe, Exmons Pro 2005(Diagnosis Software), Portable Carrying Case(450Wx340Dx120H)
IBEX pro	IBEX Pro(main body), Thermal Printer, Soft Poly-Vinyl Bag(for storage or measurement), Charger(for Li-ion Battery Pack), Pin Probe(4-Point Pin type), Clip Probe, Temperature Probe, Exmons Pro 2005(Diagnosis Software), Portable Carrying Case(450Wx340Dx120H)

Specifications and Characteristics

- Exterior size and weight (Except the measuring lead)
95W × 42D × 175H, less than 650g (including internal battery)
- Measurement ranges
10 Ah~ 6000 Ah max., 0.1 Volt ~ 16.0 Volt DC
- Measurement Accuracy
Voltage : ±0.5 class
Temperature : ±2 class (-20C° ~ +80C°)
Impedance : ±1.0% rdg. ±8dgt.
(3milli ohm full-scale) across test range
- Resolution
Impedance : 0.001mΩ
DC voltage : 10mV
Temperature : 0.5°C
- User Programmable
Over / Under Voltage alarm setting
Fail / Warning Impedance alarm setting
Over Temperature alarm setting
Display menu

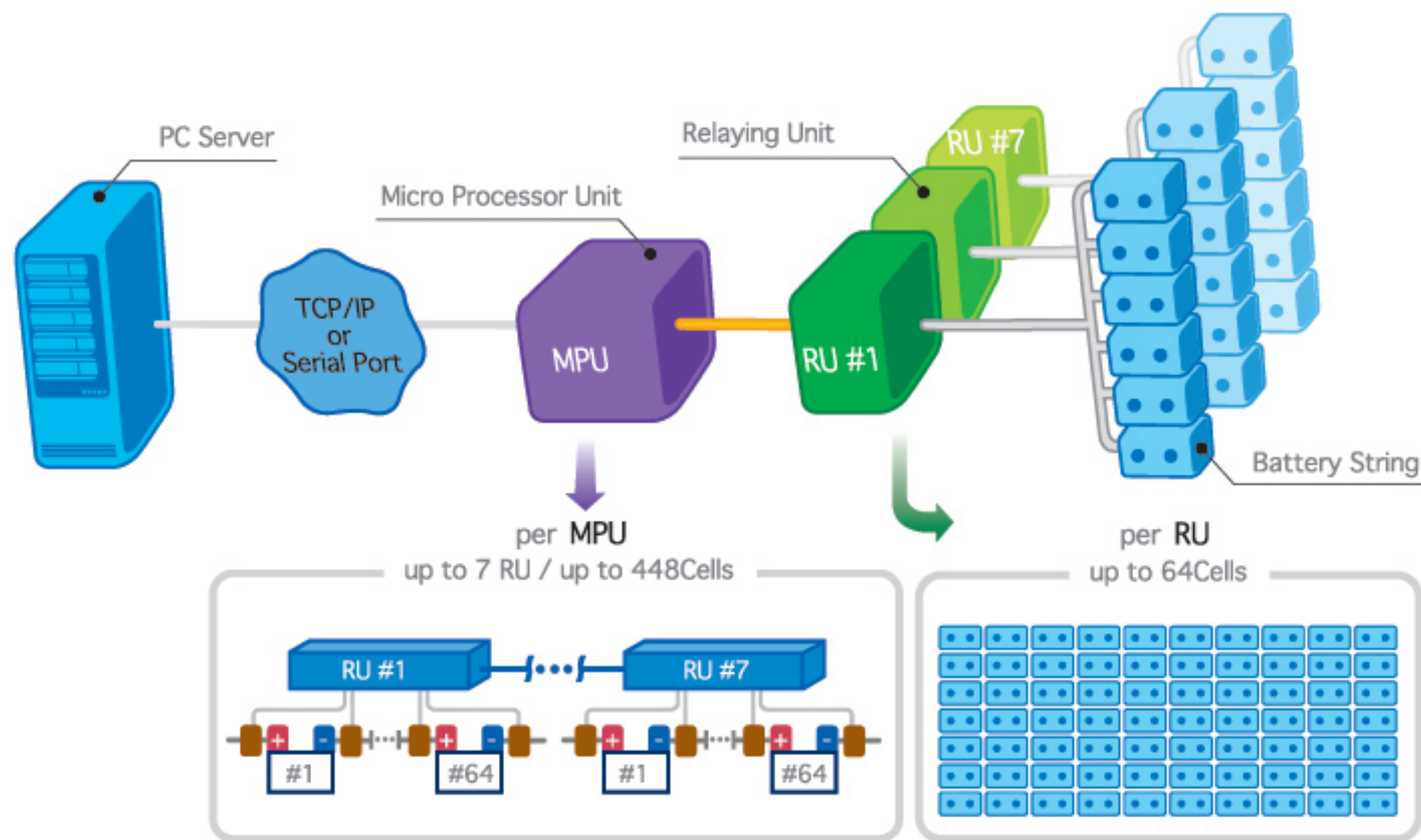
- Other available functions
Auto scaling function
Zero point adjustment function
USB serial Port
Measured data storage capacity : Choose from 15 different modes including
- Exmons Pro 2005 :Integrated diagnosis software of stationary applications
Database construction and control by site/bank/cell
2D graph display of changes against basic value
3D graph display of changes by period
Printing of data and analysis report including graph
Prohibition of data modification
- Communication Protocol : Binary or Standard ASCII Text
- Format : Excel 2000 / 2002 and Windows 98 / 2000 / XP Compatible
- Built-in Battery : Li-ion Battery (1950mAh, 11.1V)

iPQMS / BDS

iPQMS / BDS monitors and analyzes the status of stationary battery system such as voltage and current of emergency power supply power lines, charging and discharging DC voltage and current, cell voltage, temperature, internal impedance with the high accuracy in 24 hours of 365 days and TCP/IP environment, using any communication methods selected by the customer, as well as the early deterioration signs using impedance measurements with any backup batteries in most critical applications. It is an "intelligent Power Quality Monitoring Systems" to ensure the integrity of your power backup system and offers the most comprehensive diagnosis software and reporting package.

We are sure that **iPQMS / BDS** exactly meets all IEEE Std. recommendations and will be the most reliable systems for diagnosis and monitoring of all stationary applications.

System Composition



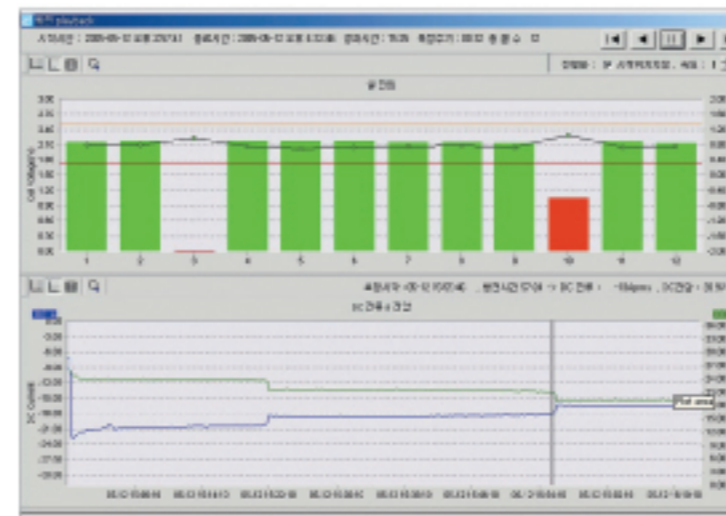
iPQMS / BDS Advantages

- **iPQMS / BDS** utilizes patented technology to identify early deterioration signs with all stationary applications by alarm, with enough time in advance to replace the failing batteries.
- Adopting the world's first ripple-removing algorithm(KR PAT No.0494489), the system precisely measures the RMS impedance value and the real properties of stationary batteries in floating charge with the precision of $\pm 2.0\%$.
- With a flexible expanding system, this system can supervise an emergency power supply lines and up to 448 cells of battery strings in real time with one monitoring / control unit. This reformative expansion capacity allows the user to arrange and install the whole system with ease, thus saving a great amount of installation expenses.
- **iPQMS / BDS** can directly transmit the data that are measured by intelligent instruments and communication software through TCP / IP ethernet, wireless and etc. as well as internet.
- When a voltage sag or power failure of emergency power lines occurs or the preset limits are exceeded, the event is transmitted to the administrator via SMS through a remote communication network such as CDMA.
- **iPQMS / BDS** offers the most comprehensive diagnosis software and reporting package
- **iPQMS / BDS** meets all IEEE standard recommendations for all the stationary battery systems.

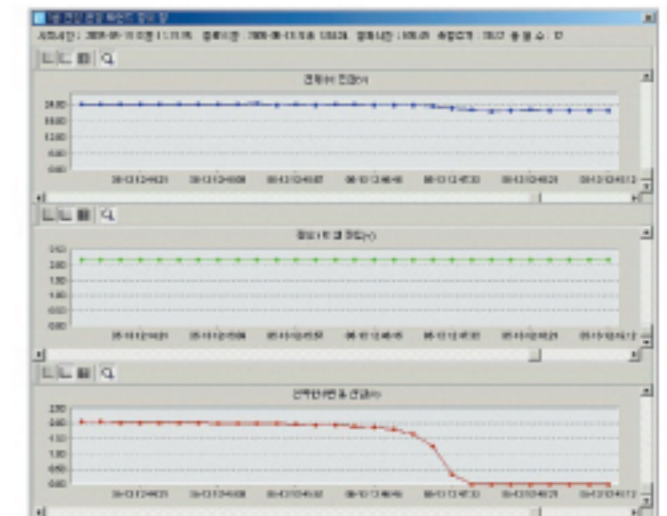
Centroid 2005 Monitored and recorded battery data



- Display of voltage and impedance of each cells
- Display of AC, UPS/voltage of charger/current
- Display of recorded event waves



- Display of recorded each cell voltage during discharge.
- Display of bad cell voltage, how fast go down under voltage failure.



- Display of trended voltage data of string DC voltage, normal cell voltage and selected cell voltage.

Model Specifications



	iPQMS /BDS 24C-4	iPQMS /BDS 64C-10	iPQMS /BDS 128C-10	iPQMS /BDS 448C-10	iPQMS /lgt
• Cell numbers	Under 24 cells	Under 64 cells	Under 128 cells	Customized production by order	Under 30 cells
• Option	1. Monitoring function of specific gravity, electrolyte level and surrounding temperature by additional sensor. 2. International standard emergency power quality monitoring; SEMI F47, CBEMA, ITIC, military, etc.				Remark

Specifications and Characteristics

- **Measurement Ranges**
 Capacity Range : 50 Ah ~ 6000 Ah max.(sealed / lead acid, Ni-Cd)
 Cell or Unit Voltage : 0.1 Volts ~ 16.0 Volts
 String DC Voltage /Current : 0V ~ 480V /0A ~ 500A
 AC voltage /AC current : 0V ~ 600V/5A (Current Transformer)
- **Measurement Accuracy**
 Cell or Unit Impedance : $\pm 2\%$
 DC Voltage /Current : Voltage $\pm 0.5\%$ / Current $\pm 1\%$
 Temperature : $\pm 2\%$
- **Resolution**
 Impedance : 0.001m Ω
 Cell Voltage : 10mV
 String DC Voltage /Current : 0.1V / 0.1A
 Cell Temperature : 0.1°C
 AC Voltage /Amp : 0.1V / 1A
- **Measuring Interval** : 5 minutes ~ 41 days (adjustable)
- **Data storage interval** : 5 minutes ~ 41 days (adjustable)

- **Measuring Speed** : 1sec /per cell
- **Data Transfer** : RS232 /422 /485, TCP /IP, CDMA (option)
- **Other available functions**
 Auto Scaling functions
 Zero point adjustment function
 Exclusion of ripple voltage in floating charge
 Measuring channel number selection
- **User Programmable Functions**
 Preset values for up to 448 cells
 Display menu
 Over / Under alarm setting : voltage, current and impedance
 Year / Date / Time setting, display menu.
- **Environmental Operating Range**
 Temperature : -5°C ~ +45°C
 Humidity : under 95% RH
- **Remark**
 Capacity Range of iPQMS / lgt : 10Ah ~ 500Ah max.



IBEX



iPQMS/BDS

Conventional Methods

While conventional methods of diagnosis of power backup batteries or stationary battery systems have been made by discharge testing to obtain meaningful information, especially with flooded (wet) cell or large VRLA battery systems.

With the **IBEX** and **iPQMS** there is no longer a need for frequent discharge tests, specific gravity tests, and inter-cell resistance testing.

New technology

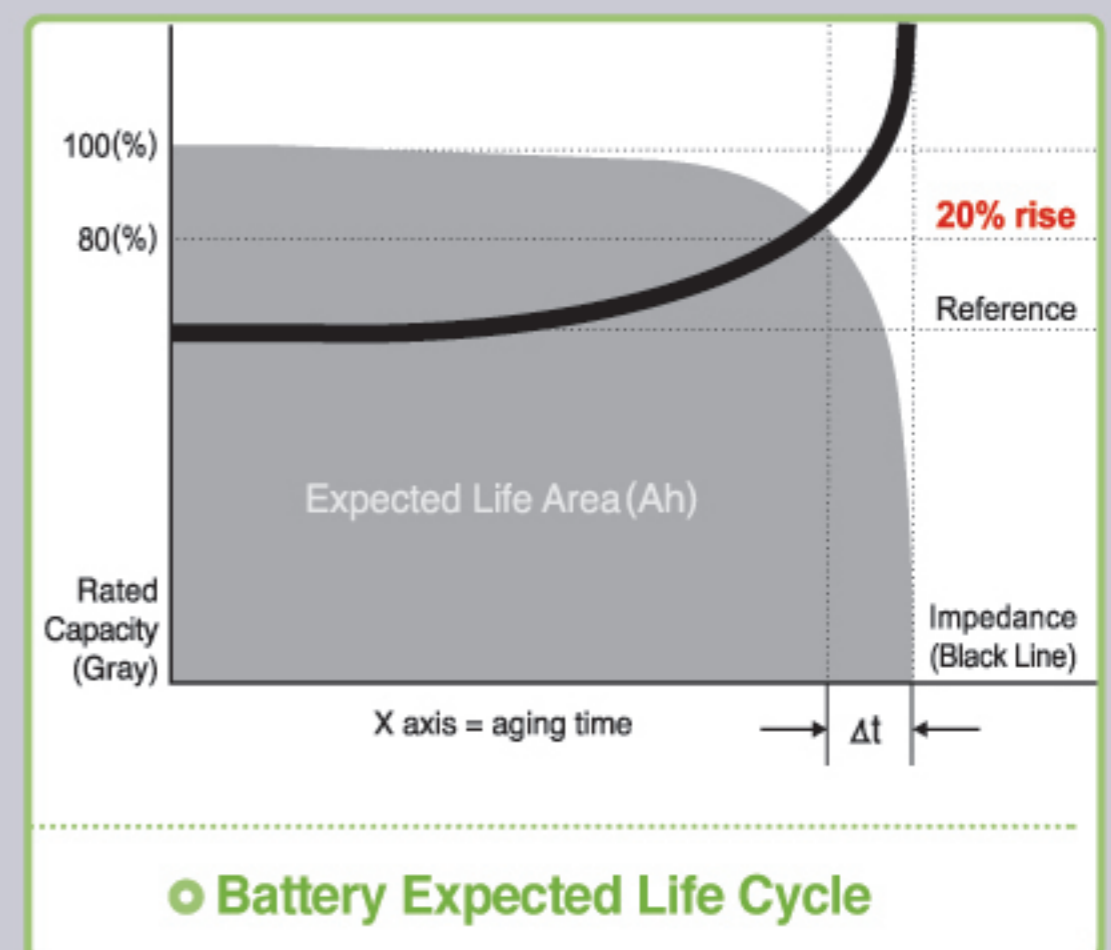
Adopting the world's first ripple-removing algorithm (KR PAT No.0494489),

POWERTRON's **IBEX** and **iPQMS** with all IEEE standard recommendations allow the user to diagnose the aging status of any battery quickly, safely and simply by impedance measuring technology in floating charge.

And reliability of the **IBEX** and **iPQMS** have been verified by diverse certifications, such as CE, Patents, KT approval (Excellent Korean Technology), ISO quality certification system and reliability verification tests of end-users, such as Korea Electric Power Corporation, Korea Telecom providers and Korea Railway Corporation.

Battery Expected Life Correlation between impedance and capacity for VRLA batteries.

- A 20% rise in internal impedance above the reference value roughly equates to 80% battery capacity, which is the point at which the IEEE recommends immediate corrective action or replacement. Based on these recommendations, POWERTRON has adopted the 20% value as the critical internal impedance alarm point.
- POWERTRON recommends to replace the battery for protecting your stationary battery system as the aging status of the battery is unpredictable as ΔT displayed on the graph after this 80% capacity point is reached.
- We believe that the only way to ensure the integrity of your VRLA battery system by IEEE recommends is to replace the bad battery in the string when the internal impedance rises 20% over.



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