Cost reduction by ACTIVE PULSAR introduction

For battery cost reduction, such as electric forklift, electric golf cart, floor cleaning machine
What is ACTIVE PULSAR

- To remove a maximum of factor sulfation (of lead sulfate crystals) that lead battery is degraded, it is a device to play, life-prolonging the battery.

- Bus from ordinary passenger cars, trucks, has been used from the starter battery, which is used, for example, special vehicles electric forklifts and golf carts, etc. floor cleaning machines, until the deep cycle battery, and effective for all lead battery.

- Installation is simple. Battery positive (+) and minus (-) to emit pulse current by connecting the poles of and to promote the decomposition and removal of sulfation. Power is not required.

- Product Summary

<table>
<thead>
<tr>
<th>Body dimensions</th>
<th>115×69×19.5 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass</td>
<td>150 g</td>
</tr>
<tr>
<td>Cord length</td>
<td>About 90cm</td>
</tr>
</tbody>
</table>
For playback and battery deterioration

バッテリーの充電と放電
① 阳極（正極）
  \[ \text{PbO}_2 + 4H^+ + 2e^- \rightarrow \text{Pb}^{2+} + 2H_2O \]
  \[ \text{Pb}^{2+} + \text{SO}_4^{2-} \rightarrow \text{PbSO}_4 \]
② 陰極（負極）
  \[ \text{Pb} \rightarrow \text{Pb}^{2+} + 2e^- \]
  \[ \text{Pb}^{2+} + \text{SO}_4^{2-} \rightarrow \text{PbSO}_4 \]
③ セル全体
  \[ \text{Pb} + \text{PbO}_2 + 2\text{H}_2\text{SO}_4 \rightarrow 2\text{PbSO}_4 + 2\text{H}_2\text{O} \]

Sulfation is required: materials are electrical source (active material)

Crystallization of sulfation
⇒ Repetition of charge and discharge, over-discharge, long-term left
⇒ And charged specific gravity is lower, the increase in the internal resistance value (lowering of the discharge capacity, operation stop)
⇒ Fatal deterioration due to heat (the heat generation of the electrolyte, the deformation of the battery, damage)
ACTIVE PULSAR here is different

- It is a technology that has been discovered in NASA in 1990 to be able to play the lead battery by passing a pulse current.
- This also been around for many products of the pulse charger-standing connection method to but, ACTIVE PULSAR even compared with them is excellent.

The difference between third-party products

1) Ideal pulse charging and discharging circuit with a pulse frequency is 20,000~80,000Hz
   - Third-party products to 20,000Hz
2) And it is equipped with a microcomputer, to develop a technology to control the pulse according to the state of the battery
   - Third-party products fixed frequency
3) The ability to automatically stop at the time of overcharge or abnormal voltage or when the termination voltage due to over-discharge
   - Third-party products only termination voltage stop function
4) 6 ~ 10mA in operation power consumption, less than 0.5m at a stop
   - Third-party products during operation 16mA, stopped 2.4mA
5) By flashing color of the body LED lamp, the discrimination function of the remaining battery capacity
   - Without this feature to third-party products
The cost reduction effect by introducing ①

- In the case of deep cycle battery (EB)
  - Electric forklifts and golf carts, EB, which is used in floor cleaning machines, itself which reduces the cost of such exchange. The more years of use by the reproduction-life extension for expensive, you can expect significant cost savings.
The cost reduction effect by introducing ②

- In the case of starter batteries (car, bus, used in such as trucks)

![Diagram showing the cost reduction effect by introducing ACTIVE PULSAR introduction]
Effect of ACTIVE PULSAR

- You can immediately feel the effect

As described above, one month after installation for supplying a pulse current of 80,000Hz of intensive, and delivers the short time effect.

Internal resistance value that indicates the degree of adhesion of sulfation is also only this steadily decomposed and removed.

Internal resistance value

<table>
<thead>
<tr>
<th>1回目 (H25.8.19)</th>
<th>2回目 (H25.9.11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3回目 (H25.10.8)</td>
<td>4回目 (H25.10.26)</td>
</tr>
</tbody>
</table>

Before putting

ACTIVE PULSAR mounted after four days

Lead sulfate crystals attached

Lead sulfate crystals disappearance