How well do you know your battery?

Batteries play a significant role in the overall safety, performance and reliability of many life-saving and life-sustaining medical devices such as infusion pumps, portable monitors or ventilators. In emergency situations or during transport, clinical personnel depend on the displayed battery charge and capacity.

Learn more about our battery concept available for the Evita® Infinity® V500, Babylog® VN500 and Evita® V300

In daily clinical practice it is essential to have equipment you can rely on. Independent from performing an intra-hospital transport to a different department or reassurance of proper function in case of power network failure, you must rely on battery data displayed on the device interface. The Association for the Advancement of Medical Instrumentation (AAMI) rates battery management as one of the top ten challenges for hospital’s biomedical departments. A US Food & Drug Administration (FDA) survey says that up to 50% of service calls in hospitals relate to battery issues. Therefore, our battery concept will support you in every situation.

AVAILABLE BATTERY TIME

Battery capacity is the determining factor of your current battery operating time. During the lifetime of a battery a reduction in the capacity is normal. It will be influenced by factors such as age, utilization, charging behavior, and/or ambient temperature. Consequently, professional battery management should include a capacity evaluation.

The only way to ascertain the true capacity is to fully discharge the battery, and measure the time it required and the capacity of discharge. The Institute of Electrical and Electronic Engineers defined in its regulations frequencies, prerequisites and instructions on how these tests should be conducted. An impedance check and date-stamping do not provide a reliable performance assessment.

This is a critical issue in a clinical environment, batteries are exposed to changing working conditions and different charge/discharge cycles. In some scenarios, batteries may not be used for a long time or remain undercharged, or conversely when utilized frequently, batteries will age and lose their capacity over the expected lifetime as a normal consequence. As result, even if the capacity displays 100% charge, the current operating time of a battery may degrade over the lifetime.

THE BATTERY CONCEPT

Our battery concept includes...

- 30 minutes* battery time with internal battery
- Integrated test procedure of the battery status
- Easy accessible information on all installed batteries and time parameter
- Current runtime in minutes available as a ventilation parameter field
- Optional 240 minutes* external battery (PS500) for e.g. intra-hospital transports
BATTERY CHECK

With our integrated battery check you will be able to determine the actual current operating time. All data is displayed in a practical overview in the battery check dialogue screen. Additionally, you have the possibility to configure your screen with a specified parameter box where the current operating time is displayed in percent of capacity and in minutes. (See picture B)

The battery check can be conducted in one procedure for both internal battery and external battery (PS500) or separately for internal or external battery (PS500). The battery check procedure operates in 3 phases: charge, discharge, and repeated charge. This is referred to as a run-down test which is the most reliable method to determine the available operating time. The battery check enables you to have an integrated reminder to perform the check regularly and will secure available reliable battery information. (See picture A)

The following information is displayed on the battery check page:

- **Last battery check**
- **Determined operating time**
- **Next battery check due in**
- **Replace battery in**
- **Current operating time**

Date of the last performed battery check for both the internal battery and the PS500 (if installed).

Operating time determined during battery check referring to usage of the device during normal operation (ventilation) without operation of a GS500.

The date when the next battery check is due.

Expected replacement date of batteries derived from age and utilization.

Current remaining operating time of each battery. This time will change during operation and is depending on the current charge status.

![Picture A: Overview of all operating data related to the internal and external battery as determined by the last performed battery check.](image-url)
FURTHER INFORMATION

The FDA organized a Battery-Powered Medical Devices Workshop (2013) to create awareness of the potential challenges related to battery-powered medical devices and to collaboratively develop ways of ensuring the continued performance and reliability of these devices. Experts agreed that routine testing at preventative maintenance keeps all batteries at an acceptable state-of-health. To determine the battery capacity a full charge/discharge/charge cycle has to be conducted.

To improve the preventive maintenance the FDA suggests amongst others visual indications, standardization of battery charging and replacement and access to performance and testing data.

REDUNDANT BATTERIES

In clinical routine, the duration and frequency of transports cannot be pre-determined. To support safe and reliable transport, the Evita Infinity V500, Babylog VN500 and Evita V300 ventilators that are equipped with an external battery (PS500), will always have an additional internal battery back-up. This redundant battery concept provides a maximum operation time with the PS500 of 240 minutes* plus an additional 30 minutes* from the internal battery.

BATTERY MAINTENANCE

The following measures can help prevent early battery degradation:
- The recharging of batteries after utilization helps to maximize operating time.
- The reconnection to mains power supply during storage can help to prevent deep discharge.
- The performance of regularly-scheduled battery checks can provide important information about available battery capacity.

*All times apply for the operation without GS500 and new and fully charged batteries.
Intra hospital transport solution with Power Supply Unit (PS500), Gas Supply Unit (GS500) and Transport Supply Unit (TSU) to offer an uninterrupted high quality mechanical ventilation.

1 Cadex Electronics Inc., Battery Management in Healthcare, (www.batteryuniversity.com)
3 According to IEEE 450, 1106, 1188, 2015, (www.sbsbattery.com)
4 Battery-Powered Medical Devices Workshop: Challenges and Opportunities by U.S. Food and Drug Administration, July 30-31, 2013, (www.mdtmag.com)
6 Hazlett, A., Division of Patient Safety Partnerships, Overview of MedSun Survey, 2013, Battery Powered Medical Devices Workshop by U.S. Food and Drug Administration