

## The Longevity Gauge - Explained

### Background

The familiar green bar on St. Jude Medical programmers is a valuable tool used to indicate the remaining longevity or battery voltage of a pacemaker or ICD. This Technical Insight is provided to help assist the clinician with the proper interpretation of the displayed bar graph. We want to emphasize that the gauge is not a representation of total battery capacity nor should it be considered a “fuel gauge.”

**In Photon/Epic(+)/Atlas(+)/Epic II/Atlas II and Identity/ADx/Victory/Zephyr devices, the gauge is based on battery voltage (in Volts).**

These devices use battery voltage as an indicator of the battery condition. The battery voltage gauge rundown is non-linear and will fluctuate based on changes in the programmed settings, percent pacing, and high voltage charging.

Assuming a constant current drain, there are periods in a pacemaker or ICD battery’s life in which the voltage drops relatively quickly and other periods where the voltage remains relatively constant. Depending on the circuitry and battery chemistry, using battery voltage alone to represent the remaining capacity may give an unreliable picture of the remaining longevity.

**For the newer Current(+)/Promote(+)/Unify/Fortify/Ellipse/Assura and Accent/Anthem/Assurity/Endurity/Allure devices, the gauge is based on remaining longevity (in Years), not battery voltage.**

The longevity estimate bar displayed on the programmer takes into account the battery voltage as well as the programmed parameters, telemetry usage, and other factors affecting current drain. The right side of the gauge is fixed at a certain number of years and is defined by the model and family of device. Since the right side has a set value, it is possible that the gauge may not read “full,” even shortly after implant.<sup>1</sup> This can occur if the device is programmed to higher output settings than nominally shipped.

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<sup>1</sup> Note that during the first 24 hours post-implant the gauge will display "full" and the remaining longevity will be stated as the full range of the bar. After 24 hours the longevity estimate is based on patient history.

### What is the Range of the Gauge?

The following table outlines the different characteristics of the battery gauge:

Device	Gauge Type	Full Gauge	Right Side of Green Bar
Current(+)/Promote(+)	Years	≥ 5 years (VR/DR) ≥ 4 years (CRT)	Longevity based on the minimum of 100% pacing or historical pacing
Ellipse/Fortify(Assura)/Unify(Assura)	Years	≥ 5 years (VR/DR/CRT)	Longevity based on the minimum of 100% pacing or historical pacing
Accent/Anthem/Assurity/Endurity/Allure	Years	≥ 5 years (VR/DR/CRT)	Longevity based on the minimum of 100% pacing or historical pacing
Photon/Epic(+)/Atlas(+)/Epic II/Atlas II	Battery Voltage	3.2 V	Measured battery voltage
Identity/ADx/Victory/Zephyr	Battery Voltage	≥2.75 V	Measured battery voltage



Figure 1: The longevity gauge (in Years).

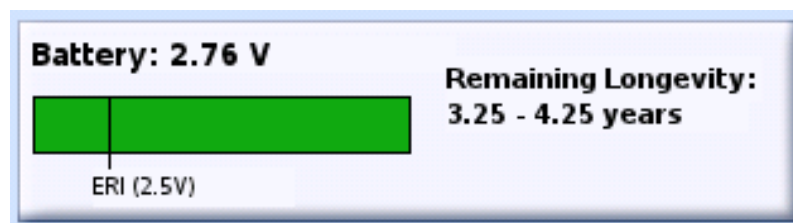


Figure 2: The longevity gauge (in Volts).

When the estimated remaining longevity is less than 90 days to ERI, the Longevity Gauge for the Unity family of devices will turn red. The reason for this is to alert the follow-up personnel that the device may reach ERI in <3 months. Once the device reaches ERI the longevity gauge disappears and is replaced with a text warning only.

If you have any questions or would like to discuss this topic in greater detail, please contact CRM Technical Services.