

SurePower™ 4

Battery Pack Guide



The issue date for the **SurePower™ 4 Battery Pack Guide (REF 9650-000811-01 Rev. A)** is **April, 2025**.

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Introduction

The ZOLL® SurePower™ 4 battery pack is a rechargeable, sealed lithium ion battery for use with the Zenix™ devices and SurePower charging stations.

It is important that you read and understand the information in this manual. The proper use of the SurePower 4 battery pack is critical to the reliable operation of your Zenix device.

Conventions

This manual uses the following conventions:

Within the text, the manual displays buttons in **boldface** type.

Note: Notes contain additional information on using and maintaining the SurePower 4 battery pack.



Warning statements describe conditions or actions that can result in personal injury or death.

Caution

Caution statements describe conditions or actions that can result in damage to the SurePower 4 battery pack.

Safety

The following sections provide important warnings, cautions, and notes regarding the SurePower 4 battery pack.

Warnings

- Place SurePower 4 battery packs where they cannot harm the patient or medical personnel if they fall; accidental sliding or drop of the SurePower 4 battery pack may cause physical injury. Damaged batteries may expose users to a safety hazard. Should the SurePower 4 battery pack be dropped, inspect and test the unit prior to further use following the procedures described in “Maintenance — Testing and Inspection” on page 5.
- Avoid prolonged exposure of the SurePower 4 battery pack to direct sunlight to minimize heating and damage that may occur from exposure to ultraviolet light.
- SurePower 4 battery packs have been tested against interference from radio frequency emissions typical of two-way radios used in emergency service/public safety activities. Refer to the appropriate Zenix EMS Operator’s Guide (**REF** 9650-000421-01) or Zenix Hospital Operator’s Guide (**REF** 9650-000420-01) to determine recommended operating distances from RF transmission equipment.
- Do not use SurePower 4 battery packs unless they have been visually inspected, tested, and recalibrated by appropriate personnel and you have been adequately trained in the proper use of these batteries. See “Maintenance — Testing and Inspection” on page 5 for more information.
- Do not disassemble the SurePower 4 battery pack.
- Charge the SurePower 4 battery pack in a well-ventilated area.
- You must perform periodic inspection, capacity testing, and functional testing of rechargeable defibrillator batteries to ensure the availability of safe and reliable batteries. See “Maintenance — Testing and Inspection” on page 5 of this guide for more information.

- When in use on a defibrillator, if the battery pack indicates a fault condition or any operating state that can prevent the effective use of the defibrillator, replace that battery pack as soon as possible.
- Do not place foreign objects into battery sockets.
- Do not use the SurePower 4 battery pack in the presence of flammable agents (such as gasoline), oxygen-rich atmospheres, or flammable anesthetics. Using the device in the presence of flammable agents can cause an explosion.
- Do not immerse or set the SurePower 4 battery pack in liquid. Using the battery near or within puddles of water may present a shock hazard to the operator, patient, or nearby personnel.
- Use only SurePower charging stations to charge SurePower 4 battery packs.
- If the display indicators on the SurePower 4 battery pack are not consistent with the indicators on the SurePower Charger Station, a fault condition may be present. Remove the battery from service as soon as practical, and verify the correct operation of the charger, defibrillator, and battery.

Cautions

- Follow all recommended maintenance instructions. If a problem occurs, obtain service immediately.
- Do not use alcohol or ketones (MEK, acetone, etc.) to clean SurePower 4 battery packs.
- Do not sterilize or autoclave SurePower 4 battery packs.
- Avoid storage of fully depleted battery packs.
- Do not install batteries into a defibrillator that is not plugged into live AC mains when storage may exceed 90 days. Battery damage may occur.
- If you are disposing of a SurePower 4 battery pack, contact your local authorities to determine the requirements for the recycling and disposal of electrical equipment and follow those requirements.
- Upon receipt of a new battery, it is important to ensure it is fully charged as soon as possible.

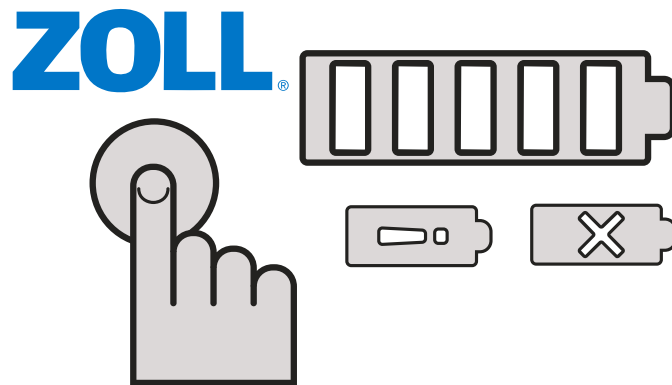
Notes

- SurePower 4 battery packs may feel warm to the touch following a large number of shocks delivered at maximum energy or after recharging.
- You can get additional information about the SurePower 4 battery pack and its use from the appropriate Zenix defibrillator operator's guide (for example, labeling information, symbols used, serial number format, date of manufacture, and so on).

Using the SurePower 4 battery pack

The SurePower 4 battery pack includes enhanced on-board processing that communicates its status to the Zenix device. It communicates both its status and specific charging requirements to the SurePower Charger. The battery also provides the following information:

- The battery's run time or capacity.
- The battery's calibration status.
- Battery Fault Indications.



Note: ZOLL ships the SurePower 4 battery pack in a partially charged state and you must fully charge the battery pack before first use.

It is very important that you recharge a depleted battery as soon as possible.

Caution	Do not store fully depleted battery packs or damage can result.
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Caution	Do not store fully charged batteries for more than 90 days. Should you need to store a battery for 90 days or longer, see "Extended Storage" on page 6 for more information.
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Displaying Battery Runtime

The SurePower 4 battery pack can display its present status.



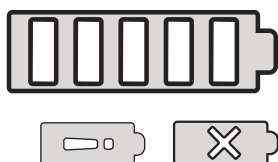
To display the status of the SurePower 4 battery pack, press and release the **Display** button on the top of the battery.

When you press and release the **Display** button, all LEDs blink to indicate that they work. The battery then lights specific LEDs for approximately 10 seconds to indicate the battery's runtime, calibration status, and fault state.

See the section below for more information on LED indications.

Note: The SurePower 4 battery pack's LEDs light *only* when the **Display** button is pressed.

SurePower 4 battery pack icon



LED Indications

This is the runtime indicator that displays the estimated runtime of the SurePower 4 battery pack in your defibrillator.

When you press and release the **Display** button on the SurePower 4 battery pack, the LEDs above these icons illuminate for approximately 10 seconds to indicate the battery's estimated run time. The LEDs will illuminate from left to right to indicate the level of charge.

If the battery is fully charged, all five LED runtime indicators illuminate. As the battery discharges, the number of illuminated LEDs decreases.

The runtime varies based on device usage. Nominally, a SurePower 4 battery pack provides the following minimum times for monitoring:

5 Bars = 100% charge, 4 hours

4 Bars = 75% charge, 3 hours

3 Bars = 50% charge, 2 hours

2 Bars = 25% charge, 1 hour

1 Bar, Blinking = <15 minutes of use

Note: If the left-most LED of the runtime indicator blinks, the battery has less than fifteen minutes of use left, and defibrillator shutdown will soon occur. Recharge the battery as soon as possible.

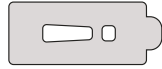
Note: Please refer to the device Operator's Guide for more accurate runtimes based on usage.

When you press the **Display** button on a battery that is installed and powering a defibrillator, the runtime indicator displays the runtime for the battery in that specific unit.

When the SurePower 4 battery pack is *not* installed in a defibrillator unit, the runtime indicator displays the runtime for the battery at a nominal drain rate.

SurePower 4 battery pack Icon

LED Indications



This is the Recalibration icon.

If the battery needs to be recalibrated, this LED illuminates for approximately 10 seconds after you press and release the **Display** button. If the Recalibration LED illuminates, the runtime indicator will *not* display runtime for that battery. For best performance of the battery, you should recalibrate the battery as soon as possible.

To manually recalibrate the SurePower 4 battery pack, you can insert the battery into the SurePower charger station using the SurePower 4 charger adapter. Perform a ManualTest (for more information, see the ZOLL *SurePower Charger Station Operator's Guide*). After you recalibrate the battery, the Recalibration LED will only flash momentarily when you press the **Display** button.

Note: For all battery packs older than three years, ZOLL recommends manual testing and recalibration every three months.



This is the Fault icon.

If the SurePower 4 battery pack detects a battery fault, this LED illuminates for approximately 10 seconds after you press the **Display** button.

If the Fault LED illuminates, the runtime indicator will *not* display runtime for that battery.

See "Understanding Battery Faults" on page 7 for more information.

Cleaning

Use only recommended cleaning agents to clean the SurePower 4 battery pack. See the *Zenix Operator's Guide* for the list of recommended cleaning agents for the battery and the device.

Do not allow cleaning agents or water to run into the crevices or connector openings of the battery.

Maintenance — Testing and Inspection

Perform a battery check as part of any regularly scheduled unit test. The battery check verifies that the battery is fully charged and fault free. Press the **Display** button to perform the battery check.

As part of your defibrillator maintenance program, verify that the battery's LEDs work. Press the **Display** button to test LEDs. If the LEDs do not work, remove the battery from service. Also check the SurePower 4 battery pack casing for cracks, damaged contacts and sockets, or other damage. If the battery pack is cracked or damaged, remove it from service.

Extended Storage

Do not store the SurePower 4 battery pack for extended periods in a fully charged state. If you must store the battery pack for an extended period, do the following:

1. Charge the SurePower 4 battery pack until three runtime LEDs illuminate.
Note: This takes approximately 1.5 hours when charging a fully depleted battery.
2. Recharge the battery to three runtime LEDs every four months.

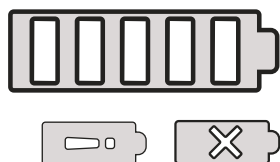
Checking Capacity Loss

To check battery capacity (the amount of charge the battery can hold), press and hold down the **Display** button for *at least* 5 seconds.



Press and hold down the **Display** button for *at least* 5 seconds.

While you hold down the **Display** button, the runtime indicator displays the battery runtime. When you release the **Display** button, the runtime indicator displays the battery capacity for 2 seconds, then redisplay the battery runtime.



During the 2 seconds after you release the **Display** button, the runtime indicator displays battery capacity. Five LEDs illuminate to indicate that the capacity is equal or close to that of a new battery.

After displaying battery capacity for 2 seconds, all LEDs blink and then redisplay the battery's runtime.

Over time, as you use the SurePower 4 battery pack, the battery capacity decreases and this capacity check illuminates fewer LEDs. When the capacity check illuminates only a single LED, the battery is at or near 60% of its original capacity, and you should remove the battery from service.

If the Recalibration or Fault LED illuminates after you release the **Display** button, the runtime indicator will *not* display the capacity or runtime for the battery.

Understanding Battery Faults

The SurePower 4 battery pack can detect one or more simultaneously occurring faults that render the battery unfit for use.

To determine the faults that affect a battery, follow this procedure when the fault light is on:



Press and hold down the **Display** button for *at least* 15 seconds.

If the battery does not detect any battery faults, all of the LEDs illuminate for 10 seconds.



The Fault LED blinks to indicate the code that identifies the battery fault.

Note: There is a brief delay before the LED blinks.

The fault codes number from 1 to 29. To indicate fault code 1, the Fault LED blinks once. To indicate fault code 2, the LED blinks twice, and so on.

If the battery detects multiple battery faults, it displays the first fault code, pauses briefly, and then displays the next fault code, and so on.

There are only two fault codes which you can take actions to clear. The following table lists these faults codes.

Note: All other fault codes require you to remove the battery from service.

For more information on these fault codes, see the appropriate Zenix defibrillator service manual.

Fault ID	Fault Type	Recommended Action
13	Battery Over Temperature During Charge. The battery is at or above its maximum temperature for charging (140°F/60°C).	Move the battery to a cooler room or out of direct sunlight, if possible, and allow the battery to cool before continuing to charge. If the ambient temperature was low when the battery reached or exceeded its maximum temperature, do not use this battery.
14	Battery Under Temperature During Charge. The battery is at or below the minimum temperature for charging (32°F/0°C).	Move the battery to a warmer room (above 32°F/0°C) and allow the battery to warm up before charging again.

SurePower 4 Battery Pack Specifications

Type	Lithium Ion
Size	4.4 (Length) x 1.9 (Width) x 3.7 (Height) in 11.2 (Length) x 4.8 (Width) x 9.4 (Height) cm
Weight	1.5 lb (.68 kg)
Voltage	Refer to battery pack label
Capacity	Refer to battery pack label
Operating Temperature	32°F to 122°F 0°C to 50°C
Cell and battery designation	(IEC 61960-3) 3INR19/66-3
Optimal Charging Temperature	59°F to 95°F 15°C to 35°C
Short Term Storage/ Transportation Temperature*	-22°F to 158°F -30°C to 70°C
Particle and Water Ingress Protection	IP 55
Altitude of Operation	-1,276 ft through 15,000 ft (below and above sea level) -389 m through 4572 m (below and above sea level)

*For *extended* storage periods, store the SurePower 4 battery pack between 60°F to 77°F (15°C to 25°C) to minimize capacity loss.