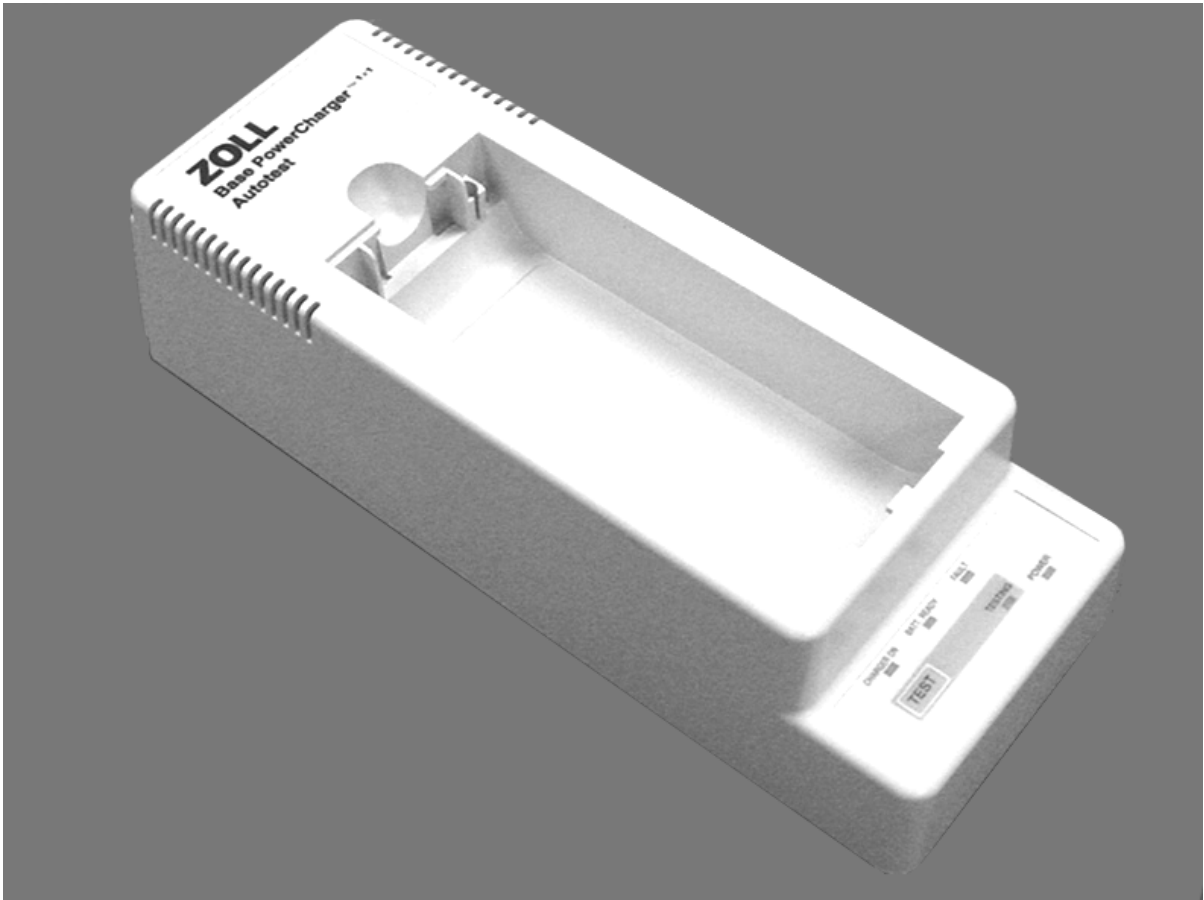


# ZOLL Base PowerCharger<sup>1x1</sup>

## Operator's Manual



**ZOLL**

Part Number 9650-0120-01 Rev. B

The revision level for this document is shown on the front cover.

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**Service Policy Warranty**

In North America: Consult your purchasing agreement for terms and conditions associated with your warranty.

Outside of North America, consult the ZOLL authorized representative.

In order to maintain this warranty, the instructions and procedures contained in this guide must be strictly followed.

For additional information, please call the ZOLL Technical Service Department 1-800-348-9011 in North America.  
(International customers: 781-229-0020).

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# Section 1

## General Information

### Product Description

The ZOLL Base PowerCharger <sup>1x1</sup> (with QuickCharge or AutoTest) is a battery charger and testing system designed for management of Battery Packs used in ZOLL Medical Corporation resuscitation devices.

The ZOLL Base PowerCharger <sup>1x1</sup> can be configured in either the **AutoTest** or **QuickCharge** mode. This configuration is performed by ZOLL Medical Corporation prior to device shipment. The Base PowerCharger<sup>1x1</sup> is clearly labeled **AutoTest** or **QuickCharge** on the charger label directly beneath the product name.

#### AutoTest

The ZOLL Base PowerCharger <sup>1x1</sup> with AutoTest automatically tests battery capacity with each battery recharge (when the battery has been depleted for 10 minutes or more) and illuminates the **BATT. READY** indicator when the battery is fully charged. With AutoTest, the full charging cycle is complete in eight (8) hours or less for the PD4410/Smart Battery and fifteen (15) hours or less for the XL Smart Battery. The AutoTest feature virtually eliminates the need to periodically test battery capacity since this test is performed each time a battery is recharged. See the M Series Operator's Manual for battery run time information.

#### QuickCharge

The ZOLL Base PowerCharger <sup>1x1</sup> with QuickCharge illuminates the **BATT. READY** indicator when the battery is fully charged. The full charging cycle is complete in four (4) hours or less for the PD 4410/Smart Battery and eight (8) hours or less for the XL Smart Battery . The QuickCharge version provides **no** information regarding battery capacity because it does **not** test capacity with each recharge. The ZOLL Base PowerCharger <sup>1x1</sup> with QuickCharge relies on the user to manually initiate the battery test cycle at recommended intervals (see Manual Battery Testing Procedure) in order to confirm adequate battery capacity.

### How to Use This Manual

This manual provides information necessary for the use and care of the Base PowerCharger <sup>1x1</sup> and ZOLL Batteries. A thorough understanding of this information is required for proper charging and maintenance of ZOLL Batteries. Reliable operation of ZOLL Medical Corporation resuscitation devices requires proper battery care.

### Section Descriptions

This manual is divided into five sections. The operator should read each section carefully.

#### Section 1 - General Information

Provides Cautions, Warnings and a general product overview of the Base PowerCharger <sup>1x1</sup>. Includes detailed product specifications and important ZOLL service information.

#### Section 2 - Operation

Describes the function of all controls and indicator lights of the Base PowerCharger <sup>1x1</sup>. Discusses proper setup of the Base PowerCharger <sup>1x1</sup> and provides charging and testing instructions.

#### Section 3 - Maintenance and Troubleshooting

This section describes several routine checks to assure proper unit operation. It includes cleaning and maintenance instructions and troubleshooting guides intended for use by nontechnical personnel.

#### Section 4 - Battery Management

Provides information for determining your particular battery requirements and program implementation steps to setup a comprehensive, effective and safe battery management program.

#### Section 5 - EMC Specifications

Provides detailed product information pertaining to EMC Emissions and Immunity testing.

### Manual Updates

If you purchased your product more than three years ago, contact ZOLL to determine whether updates to your documentation are available. For information relating to recent manual updates, contact ZOLL Medical Corporation's Technical Service Department at 1-781-229-0020.

### Unpacking

Carefully inspect each container for damage. If the shipping container or cushion material is damaged, it should be kept until the contents have been checked for mechanical and electrical integrity. If the contents are incomplete, if there is mechanical damage, or if the instrument does not pass its electrical self-test, customers should call ZOLL's Technical Service Department at 1-781-229-0020.

The following items are packed in the Base PowerCharger <sup>1x1</sup> shipping container:

- Base PowerCharger <sup>1x1</sup>
- Base PowerCharger <sup>1x1</sup> AC Power Cord
- 1 Base PowerCharger <sup>1x1</sup> Operator's Guide

# Warnings and Cautions

## Warnings

### General

- The Base PowerCharger <sup>1x1</sup> has been tested against interference from radio frequency emissions typical of two-way radios used in emergency service/public safety activities. Users of the Base PowerCharger <sup>1x1</sup> should refer to Section 5 to determine recommended operation distances from RF transmission equipment.
- Use only the AC power line cord supplied with the device. Failure to use the proper line cord could result in excess leakage currents and reduced safety.
- Do not disassemble the Base PowerCharger <sup>1x1</sup>. A shock hazard exists. Refer all problems to ZOLL Technical Service.
- Follow all recommended maintenance instructions. If a problem occurs, obtain service immediately. Do not use the Base PowerCharger <sup>1x1</sup> until the unit has been inspected by the appropriate personnel.
- Do not place anything on top of or beneath the Base PowerCharger <sup>1x1</sup>, such as blankets or cloths. Doing so may block the vents on the unit, preventing proper dissipation of heat during operation.
- Do not use adjacent to or stacked with other equipment. If adjacent or stacked use is necessary the Base PowerCharger <sup>1x1</sup> should be observed to verify normal operation.
- Do not sterilize the Base PowerCharger <sup>1x1</sup>.
- Do not use alcohol or ketones (MEK, acetone, etc.) on the Base PowerCharger <sup>1x1</sup>.
- Always wait until the Base PowerCharger <sup>1x1</sup> has completed its charge cycle before removing batteries.
- Repeated use of partially charged batteries will reduce their capacity and operating life.

- Do not use a battery unless the **BATT. READY** indicator is lit and the **FAULT** light is off. Failure to do so may result in the use of a fully depleted battery.
- Do not install batteries into Monitor/Defibrillators when storage may exceed 90 days. Battery damage may occur.

### Operator Safety

- Do not operate the Base PowerCharger <sup>1x1</sup> in the presence of flammable agents (such as gasoline), oxygen-rich atmospheres, nitrous oxide, or flammable anesthetics. Using the device near the site of a gasoline spill may cause an explosion.
- Do not immerse or set the Base PowerCharger <sup>1x1</sup> in liquid. Using the device near or within puddles of water may present a shock hazard to the operator, patient, and nearby personnel.

### Patient Safety

- Do not mount the device directly above the patient. Locate the Base PowerCharger <sup>1x1</sup> and ZOLL resuscitation devices where they cannot harm the patient if they fall.

### Caution

- When a fully charged battery is placed into the Base PowerCharger <sup>1x1</sup> with the AutoTest, the AutoTest will **NOT** activate and the **BATT. READY** indicator will illuminate within a few minutes after inserting the battery into the charger. Since the AutoTest sequence is not performed, it is possible to have a shorter battery run time than expected.

## Specifications

### Base PowerCharger 1x1

#### General

<b>Size</b>	8.2 cm H x 15.8 cm W x 31.8 cm L (3.2 in. x 6.2 in. x 12.5 in.)
<b>Weight</b>	2.1 kg (4.5lbs) without batteries.
<b>Equipment Classification</b>	Class 1, No Patient Applied Parts, Ordinary, Portable, Continuous Operation
<b>Input Rating</b>	100-120 VAC, 50/60 Hz, 340mA. (or) 220-240 VAC, 50/60 Hz, 170mA.
<b>Safety Standards</b>	Designed to meet or exceed: EN60601-1 Medical Electrical Equipment Part 1: General Requirements for Safety.  Designed to meet or exceed: IEC 60601-1-2 Medical Electrical Equipment Part 1-2: General Requirements for Safety.  Collateral standard: Electromagnetic Compatibility - Requirements and Tests.  UL2601-1 Standard for Medical Electrical Equipment. Part 1: General Requirements for Safety with respect to Electrical Shock, Fire and Mechanical Hazards only.  (UL Classification mark associated with 100-120 VAC input only.)

#### Recharge Time

<b>QuickCharge</b>	Four hours or less for total recharge of fully depleted battery for PD 4410/Smart Battery. Eight hours or less for XL Smart Battery.
<b>AutoTest</b>	Eight hours or less for AutoTest and total recharge of battery for PD 4410/Smart Battery. Fifteen hours or less for XL Smart Battery.

<b>Temperature</b>	5 °C to 40 °C(operating) 15°C to 35°C (optimal battery charging) -40°C to 70°C (storage and transportation)
<b>Humidity</b>	5% to 95% (relative humidity - non condensing).
<b>External Fuses</b>	(2 ) 400 mA/250V Time Delay fuses for 100-120 VAC input. (2) 200mAL/250V, Type T fuses for 220-240 VAC input.

## Displays

<b>POWER</b>	Illuminates when Base PowerCharger 1x1 is plugged into live AC mains.
<b>CHARGER ON</b>	Indicates battery is being charged.
<b>BATT. READY</b>	Illuminates when the charge cycle is complete.
<b>FAULT</b>	Illuminates when battery capacity test or battery compartment test fails
<b>TESTING</b>	Illuminates when either a battery test or a battery compartment test is in progress.  Base PowerCharger1x1 with AutoTest only: Illuminates with the <b>CHARGER ON</b> light during AutoTest and recharge of the battery.

## Controls

<b>TEST Button</b>	Illuminates TESTING indicator light and initiates battery test cycle or battery compartment test.  Automatically charges, discharges and recharges the battery.
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## ZOLL Batteries

<b>Type</b>	Rechargeable , sealed lead acid. ZOLL Battery Pack PD 4410 ZOLL Smart Battery ZOLL XL Smart Battery
<b>Weight</b>	PD 4410/Smart Battery: 1 kg (2.2 lbs) XL Smart Battery: 1.68 kg (3.7 lbs)
<b>Size</b>	PD 4410/Smart Battery: 4 cm H x 7 cm W x 18.9 cm L (1.58 in. x 2.78 in. x 7.44 in.)  XL Smart Battery: 9.4 cm H x 7 cm W x 20 cm L (3.7 in. x 2.78 in. x 7.9 in.)
<b>Capacity</b>	PD 4410/Smart Battery: 2.5 Amp Hour rating for new batteries  XL Smart Battery: 4.5 Amp Hour rating for new batteries
<b>Nominal Battery Voltage</b>	2.0 V/cell; 5 cells.
<b>Temperature</b>	0 °C to 50 °C(operating) 15°C to 35°C (optimal battery charging) -40°C to 70°C (storage and transportation)
<b>Humidity</b>	5% to 95% (relative humidity - non condensing).
<b>Capacity Test</b>	At a minimum, test batteries every three months. Refer to ZOLL's Battery Management Program brochure.



## Symbols Used on the Equipment

Any or all of the following symbols may be used in this manual or on this equ equipment:



**Attention** Refer to manual for more information



Protective (earth) ground terminal



Alternating current



**Conformité Européenne** Complies with the medical device directive 93/42/EEC

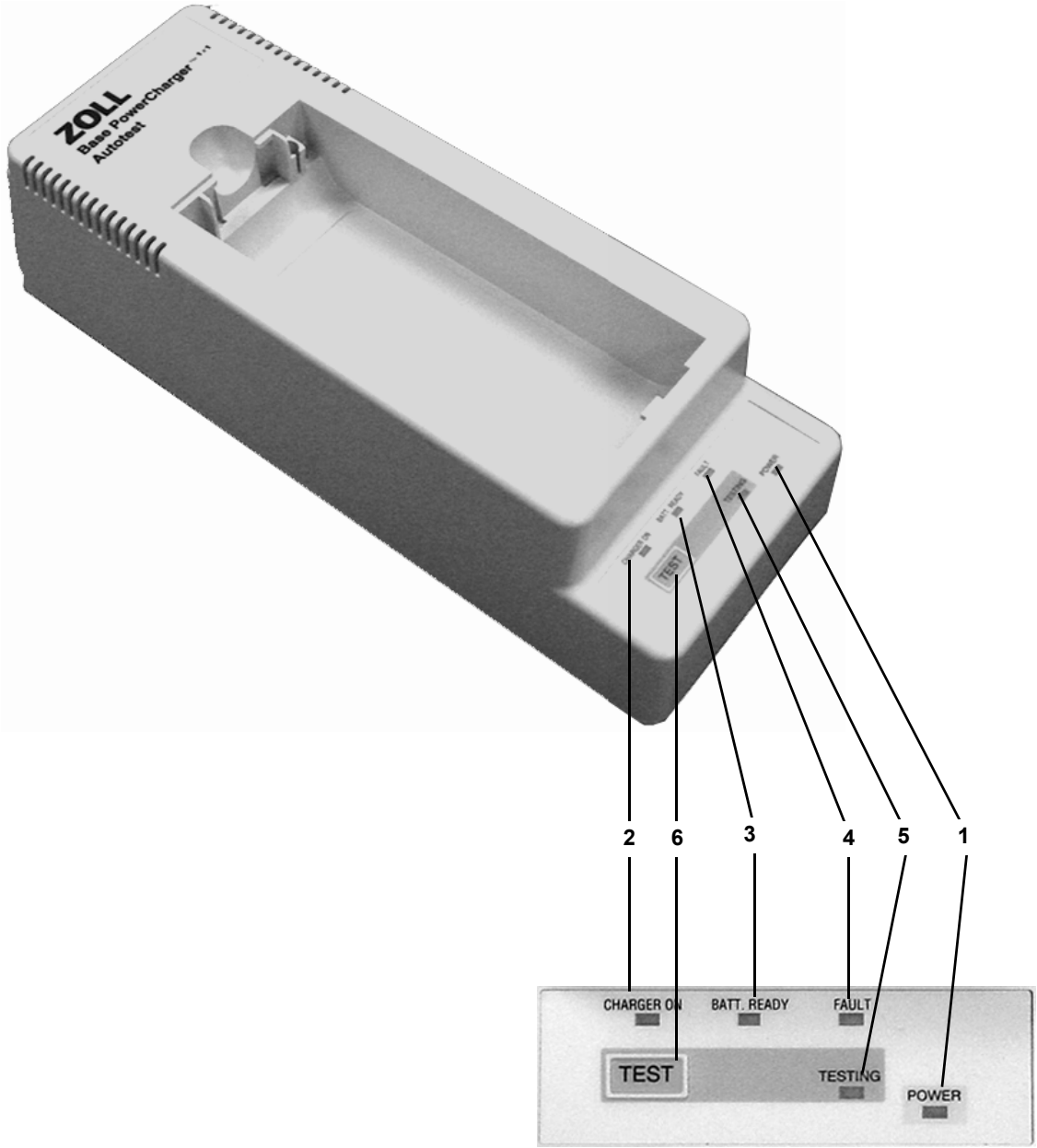
## Service

Should the Base PowerCharger <sup>1x1</sup> require service, return it in its original container, to the nearest authorized ZOLL Medical Corporation service center.

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# Section 2

## Operation



Refer to the Operating Controls and Indicators section on the next page for a description of each number. All references to Base PowerCharger 1x1 refer to AutoTest and QuickCharge unless otherwise specified.

## Operating Controls and Indicators

The ZOLL Base PowerCharger 1x1 with AutoTest automatically tests battery capacity with each battery recharge. In addition, the ZOLL Base PowerCharger 1x1 with AutoTest illuminates the **BATT. READY** indicator when the battery is fully charged. Fully charged batteries whose capacity is insufficient will cause the **FAULT** light to illuminate. See the M Series Operator's Manual for run time information. With AutoTest, the full charging cycle is complete in 8 hours or less for the PD 4410/Smart Battery and 15 hours or less for the XL Smart Battery.

The ZOLL Base PowerCharger 1x1 with QuickCharge provides no information regarding battery capacity because it does **not** test the battery capacity with each recharge. The ZOLL Base PowerCharger 1x1 with QuickCharge relies on the user to manually initiate the battery test cycle at recommended intervals (see Manual Battery Testing Procedure) in order to confirm adequate battery capacity. The Base PowerCharger 1x1 with QuickCharge illuminates the **BATT. READY** indicator when the battery is fully charged. The full charging cycle is complete in 4 hours or less for the PD 4410/Smart Battery and 8 hours or less for the XL Smart Battery.

### 1. POWER

Illuminates when the Base PowerCharger 1x1 is connected to live AC mains and the unit is ready for charging and/or testing.

### 2. CHARGER ON

Illuminates when a battery is properly installed in the charging/testing compartment and the test/charge cycle is in progress.

Illuminates with the **TESTING** light during AutoTest and recharge of the battery.

### 3. BATT. READY

#### **AutoTest**

Illuminates at the end of a test/charge cycle to indicate that the battery has been charged to 100% of its present capacity and is ready for use.

Indicates the battery compartment or battery has passed the capacity test and is operating properly.

#### **QuickCharge**

Illuminates at the end of a charge cycle to indicate that the battery has been charged to 100% of its present capacity and is ready for use.

If using a QuickCharge unit the **BATT. READY** light does NOT give any indication as to the available run time left in the battery.

### 4. FAULT

Illuminates, with the **TESTING** light, when battery capacity test fails. Also, illuminates when a battery compartment or any other failure occurs.

### 5. TESTING

Illuminates when either battery capacity test cycle is in progress or battery compartment test is completed.

Illuminates with the **BATT. READY** light (Manual Test Only) indicating a good fully charged battery.

Illuminates with the **FAULT** light to indicate a battery that has failed the capacity test.

Illuminates with the **CHARGER ON** light during AutoTest and recharge of the battery.

## 6. TEST button

Initiates battery test cycle or battery compartment test. The battery capacity test cycle automatically charges, discharges and recharges the battery.

If a battery is installed in the battery compartment and the **TEST** button is pressed, a capacity test is performed. If the battery compartment is empty and the **TEST** button is pressed, a compartment test is performed.

## Setup

Place the Base PowerCharger 1x1 on a stable secure surface. There must be at least 4 inches of clear space around the unit to allow for proper heat dissipation during charging or testing batteries. Do not place anything on top of or beneath the unit, such as blankets or cloths. Doing so may block the vents on the unit, preventing proper dissipation of heat during operation.

Turn the unit on by plugging the line cord into the power module at the rear of the unit and then into live AC mains.

## Battery Charging

### Caution

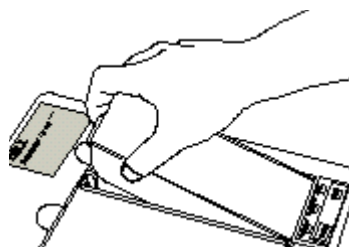
- When a fully charged battery is placed into the Base PowerCharger 1x1 with the AutoTest, the AutoTest will **NOT** activate and the **BATT. READY** indicator will illuminate within a few minutes. Since the AutoTest sequence is not performed, it is possible to have a shorter battery run time than expected. To initiate a test of a fully charged battery follow the instructions under the **Manual Battery Testing Procedure**.

When using AutoTest, proper placement of the battery into the compartment will automatically initiate the test and charging cycle, however, when using QuickCharge units, only the charging cycle will be initiated.

To charge a battery:

1. Check to see that the unit is connected to live AC mains. The **POWER** light should be lit.

2. Insert battery into the compartment. Make sure the battery is fully seated (A click can be heard).

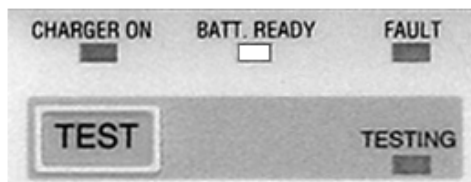


3. The **CHARGER ON** and **TESTING** indicators illuminate and remain on during complete AutoTest and recharge cycle (shown). Only the **CHARGER ON** indicator illuminates during a QuickCharge recharge cycle.



4. In 8 hours or less for the PD 4410/Smart Battery or 15 hours or less for the XL Smart Battery (using AutoTest) the **CHARGER ON** light will go off and the **BATT. READY** light will illuminate indicating the battery has passed the capacity test and is fully charged and ready for use.

In 4 hours or less for the PD 4410/Smart Battery or 8 hours or less for the XL Smart Battery (using QuickCharge) the **CHARGER ON** light will go off and the **BATT. READY** light will illuminate indicating the battery has been charged to 100% of its present capacity and is ready for use.



If the battery or charger is not capable of charging, the **FAULT** light will illuminate and the **CHARGER ON** light may stay on. Before discarding the battery, test the battery compartment for defective operation (see **Operational Checks** Section) and perform a second battery test.



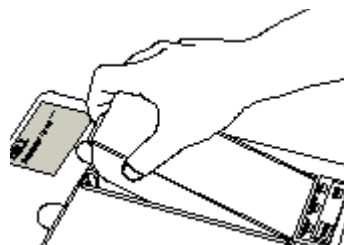
5. To remove the battery, insert a finger into the recess at the top of the battery compartment, press against the battery to disengage the battery locking clip and lift the battery out. A charger test is performed illuminating all LED's briefly followed by the **BATT. READY** and **TESTING** indicators illuminating for 2 seconds and then all LED's go off except for the **POWER** LED.

### Manual Battery Testing Procedure

Although this test is available, the Auto Test feature eliminates the need to manually test batteries since battery capacity is automatically tested with each battery recharge (except when a fully charged battery is placed in the unit). It is not necessary to insert a fully charged battery for testing; the Base PowerCharger <sup>1x1</sup> will automatically test the battery regardless of charge status.

To test a battery:

1. Check to see that the Base PowerCharger <sup>1x1</sup> is connected to live AC mains. The **POWER** light should be lit.
2. Insert battery into the charger. Make sure the battery is fully seated. (A click can be heard).



3. Press the **TEST** button. The **TESTING** indicator light will illuminate for the duration of the test cycle.



4. If the battery passes the test, the **BATT. READY** light will illuminate while the **TESTING** light remains lit indicating the battery is fully charged and ready to use. See the M Series Operator's Manual for run time information.
5. If a battery fails the test, the **FAULT** light will illuminate while the **TESTING** light remains lit. Before discarding the battery, test the battery compartment for possible defective operation (See **Operational Checks** Section). Repeat Battery test.
6. Record the date and results of the test on the battery label.

**Quick Reference Chart for Base PowerCharger 1x1 with AutoTest**

The following chart describes the operation of the Base PowerCharger 1x1 with AutoTest. The chart on top represents normal LED operation for the Base PowerCharger 1x1 with AutoTest when a good battery is installed in the compartment. The bottom chart represents the Base PowerCharger 1x1 with AutoTest when a bad battery is installed in the compartment. Illumination of specific indicator lights together represent a specific mode of operation described in the **Description** column.

<b>LED NORMAL OPERATION - GOOD BATTERY</b>					
	<b>CHARGER ON</b>	<b>BATT. READY</b>	<b>FAULT</b>	<b>TESTING</b>	<b>Description</b>
<b>AutoTest with Battery in Compartment</b>	<b>ON</b>			<b>ON</b>	AutoTest is in progress.
		<b>ON</b>			AutoTest is complete and the battery is in good condition.
<b>Manual Test with Battery in Compartment and "TEST" button pushed</b>				<b>ON</b>	Manual Test is in progress.
		<b>ON</b>		<b>ON</b>	Manual Test is complete and the battery is in good condition.

<b>LED OPERATION - BAD BATTERY</b>					
	<b>CHARGER ON</b>	<b>BATT. READY</b>	<b>FAULT</b>	<b>TESTING</b>	<b>Description</b>
<b>AutoTest with Battery in Compartment</b>	<b>ON</b>			<b>ON</b>	AutoTest is in progress.
			<b>ON</b>	<b>ON</b>	AutoTest is complete and the battery is NOT usable.
<b>Manual Test with Battery in Compartment and "TEST" button pushed</b>				<b>ON</b>	Manual Test is in progress.
			<b>ON</b>	<b>ON</b>	Manual Test is complete and the battery is NOT usable.

### Quick Reference Chart for Base PowerCharger 1x1 with QuickCharge

The following chart describes the operation of the Base PowerCharger 1x1 with QuickCharge. The chart on top represents normal LED operation for the Base PowerCharger 1x1 with QuickCharge when a good battery is installed in the compartment. The bottom chart represents the Base PowerCharger 1x1 with QuickCharge when a bad battery is installed in the compartment. Illumination of specific indicator lights together represent a specific mode of operation described in the **Description** column.

LED NORMAL OPERATION - GOOD BATTERY					
	CHARGER ON	BATT. READY	FAULT	TESTING	Description
QuickCharge with Battery in Compartment	ON				Charging is in progress.
		ON			Charging is complete
Manual Test with Battery in Compartment and "TEST" button pushed				ON	Manual Test is in progress.
		ON		ON	Manual Test is complete and the battery is in good condition.

LED OPERATION - BAD BATTERY					
	CHARGER ON	BATT. READY	FAULT	TESTING	Description
QuickCharge with Battery in Compartment	ON				Charging is in progress.
			ON		Charging is complete and the battery is NOT usable.
Manual Test with Battery in Compartment and "TEST" button pushed				ON	Manual Test is in progress.
			ON	ON	Manual Test is complete and the battery is NOT usable.

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# Section 3

## Maintenance and Troubleshooting

Following is a list of nontechnical operational checks. These checks should be performed periodically to ensure proper equipment operation. If during this procedure, the operator discovers a malfunction, contact ZOLL Technical Service.

### Inspection

Assure that the unit is clean (with no fluid spills) and nothing is stored on the unit.

Inspect all batteries for good condition.

### Cleaning

Clean the Base PowerCharger <sup>1x1</sup>, with a soft cloth, mild soap and water.

Do not immerse any part of the Base PowerCharger <sup>1x1</sup> in water. Do not use alcohol or ketones (MEK, acetone, etc.). Do not autoclave the Base PowerCharger <sup>1x1</sup>.

### Operational Checks

1. Connect the unit to live AC mains. All four indicator lights will illuminate for approximately 4-5 seconds. The **POWER** indicator will remain lit while the other lights go off.
2. With the battery compartment empty, check that all indicator lights except **POWER** are off.
3. Press the **TEST** button to check that the unit is fully operational.
4. All four indicator lights will illuminate for approximately 4-5 seconds.
5. If the **TESTING** light and **BATT. READY** light remain lit for three seconds while the other lights go off, the unit is fully operational without any defects.
6. If the **FAULT** light remains lit, the unit is defective.
7. Insert a battery into the compartment. Verify that the **CHARGER ON** light illuminates immediately.

### Troubleshooting

The troubleshooting guide provided below is intended for use by nontechnical personnel during operation. This section answers many of the common problems or questions that arise during operation.

If trouble persists after consulting this guide, call ZOLL and ask for the Technical Service Department.

1. **POWER** light does not illuminate.
  - Check that unit is plugged into an appropriate power source.
  - Check for defective power cord.
  - Plug unit into another power source.
  - Check for blown fuse.
2. **CHARGER ON** indicator light does not illuminate when battery is in compartment.
  - Check that battery is properly seated in compartment.
  - Check that battery contacts are clean and not damaged.
  - Check that unit is plugged into an appropriate power source.
  - Test the battery compartment for functionality.
  - Place another battery in the compartment.
3. **TESTING** light does not illuminate when TEST button is pressed.
  - Check that battery is properly seated in compartment.
  - Check that unit is plugged into an appropriate power source.
  - Verify that battery compartment is fully operational with no defects.
  - Repeat test cycle.
  - If battery fails second test remove battery from use.

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# Section 4

## Battery Management

Safe, reliable use of all ZOLL devices require a well designed battery management program to ensure that adequate battery power is always available.

The 6 key steps to developing a battery program are:

1. Obtain proper equipment.  
Plan to have a sufficient number of battery packs and chargers to insure an adequate supply of fully charged primary use and spare use batteries.
2. Assign a responsible individual.  
Assign the responsibility to an individual who can oversee all aspects of the program as well as educate other ZOLL Monitor/Defibrillator users.
3. Define battery exchange and charging routines.  
Clinical and technical staff should determine desired use patterns and an optimum sequence to insure consistent charging and exchange routines.
4. Ensure sufficient spare battery capability.  
A fully-charged spare battery should be kept immediately available with all ZOLL Monitor/Defibrillator devices. The availability of more than one spare battery is recommended in cases where prolonged or repeated use of the device may be required, such as long transport situations.
5. Develop backup procedures.  
Procedures to maintain appropriate life support (such as cardiopulmonary resuscitation) should be pre-planned in the event of a device failure and another battery or device must be sought.
6. Test batteries regularly.  
Develop a testing schedule as part of your organization's battery management program. The appropriate frequency of testing depends on the age of the battery pack and the frequency and type of use. As the battery ages, testing should be more frequent since failure will occur rapidly at the battery's end-of-life. At a minimum, ZOLL recommends testing every three months. For additional information on Battery Management refer to the ZOLL Battery Management Program (order #9650-0019).

### ZOLL Battery Packs

The ZOLL Battery Pack is a five-cell assembly of sealed lead-acid batteries specifically designed for use with all ZOLL Monitor/Defibrillator devices.

Lead acid battery packs require full recharging after use. Continuous short cycle recharging will result in reduced capacity and early battery pack failure.

### Battery Life Expectancy

Frequency of use, number of batteries used, and the pattern of discharging and recharging batteries contribute to the loss of battery charge capacity. Because of this ZOLL recommends that operators replace and discard used batteries on a preventive, scheduled basis. The most effective preventive replacement interval should be based on anticipated use patterns, battery pack testing results and experience with the device in actual operation. ZOLL recommends battery replacement every eighteen months or sooner.

For more information about such a schedule, contact your ZOLL Technical Service Representative.

### Low Battery Message

As individual battery capacity diminishes, the amount of operating time remaining after a LOW BATTERY message also diminishes. For newer or lesser-used batteries, the operating time remaining after this warning will be significantly longer than the operating time remaining on batteries having seen more use. In either case, this warning will ultimately lead to defibrillator shut-off, and consequently, the low battery should be replaced with a fully-charged battery as soon as possible.

When a LOW BATTERY message is displayed, replace the battery pack immediately to ensure continuous operation.

### Battery Disposal

Place the battery in an acid resistant container. Dispose of the battery in accordance with federal, state, and local regulations. Do not incinerate batteries. Batteries should be shipped to a reclamation facility for recovery of metal and plastic compounds as the proper method of waste management.

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# Section 5

## EMC Specifications

### Guidance and Manufacturer's Declaration - Electromagnetic Emissions

The ZOLL Base PowerCharger <sup>1x1</sup> is intended for use in the electromagnetic environment specified below. The customer or the user of the ZOLL Base PowerCharger <sup>1x1</sup> should ensure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR11	Group 1	The ZOLL Base PowerCharger <sup>1x1</sup> uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	
Harmonic Emission IEC 61000 3-2	Not applicable	
Voltage Fluctuations/Flicker Emission IEC 61000 3-3	Not applicable	
Medical Electrical Equipment needs special precautions regarding EMC and needs to be installed and put into service according to EMC information provided in this document.		


## Guidance and Manufacturer's Declaration - Electromagnetic Immunity

The ZOLL Base PowerCharger <sup>1x1</sup> is intended for use in the electromagnetic environment specified below. The customer or the user of the ZOLL Base PowerCharger <sup>1x1</sup> should ensure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV I/O	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode +/- 2 kV common mode	± 1 kV differential mode +/- 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines. IEC 61000-4-11	<5% $U_t$ (>95% dip in $U_t$ ) for 0.5 cycle 40% $U_t$ (60% dip in $U_t$ ) for 5 cycles 70% $U_t$ (30% dip in $U_t$ ) for 25 cycles <5% $U_t$ (>95% dip in $U_t$ ) for 5 sec	<5% $U_t$ (>95% dip in $U_t$ ) for 0.5 cycle 40% $U_t$ (60% dip in $U_t$ ) for 5 cycles 70% $U_t$ (30% dip in $U_t$ ) for 25 cycles <5% $U_t$ (>95% dip in $U_t$ ) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the ZOLL Base PowerCharger <sup>1x1</sup> requires continued operation during mains interrupting, it is recommended that the ZOLL Base PowerCharger <sup>1x1</sup> be powered from an uninterruptible power supply.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment
<b>Note:</b> $U_t$ is the a.c. mains voltage prior to application of the test level.			

## Guidance and Manufacturer's Declaration - Electromagnetic Immunity (Non-Life Supporting Equipment)

The ZOLL Base PowerCharger <sup>1x1</sup> is intended for use in the electromagnetic environment specified below. The customer or the user of the ZOLL Base PowerCharger <sup>1x1</sup> should ensure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
			Portable and mobile RF communications equipment, including cables, should be used no closer to any part of the ZOLL Base PowerCharger <sup>1x1</sup> than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
			<b>Recommended separation distance</b>
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	$d = 1.17 \sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	$d = 1.17 \sqrt{P}$ 80 MHz to 800 MHz
			$d = 2.33 \sqrt{P}$ 800 MHz to 2.5 GHz
			<p>where <math>P</math> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <math>d</math> is the recommended separation distance in metres (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,<sup>a</sup> should be less than the compliance level in each frequency range.<sup>b</sup></p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p><b>Note 1:</b> At 80 MHz and 800 MHz the higher frequency range applies.</p> <p><b>Note 2:</b> These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</p>			
<p><sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the ZOLL Base PowerCharger <sup>1x1</sup> is used exceeds the applicable RF compliance level above, the ZOLL Base PowerCharger <sup>1x1</sup> should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the ZOLL Base PowerCharger <sup>1x1</sup>.</p>			
<p><sup>b</sup> Over the frequency range 150 kHz to 80 MHz, field strengths should be less than <math>[V_1]</math> V/m.</p>			

## Recommended Separation Distances for RF Communications Equipment (Non-Life Supporting Equipment)

The ZOLL Base PowerCharger 1x1 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the ZOLL Base PowerCharger 1x1 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the ZOLL Base PowerCharger 1x1 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter (W)	Separation distance according to frequency of transmitter (m)		
	150 kHz to 80 MHz $d = \left[\frac{3.5}{3}\right]\sqrt{P}$	80 MHz to 800 MHz $d = \left[\frac{3.5}{3}\right]\sqrt{P}$	800 MHz to 2.5 GHz $d = \left[\frac{7}{3}\right]\sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.37	0.37	0.74
1	1.17	1.17	2.3
10	3.69	3.69	7.38
100	11.70	11.70	23.33

For transmitters rated at a maximum output power not listed above, the recommended separation distance  $d$  in metres (m) can be determined using the equation applicable to the frequency of the transmitter, where  $P$  is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

**Note 1:** At 80 MHz and 800 MHz the higher frequency range applies.

**Note 2:** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.







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