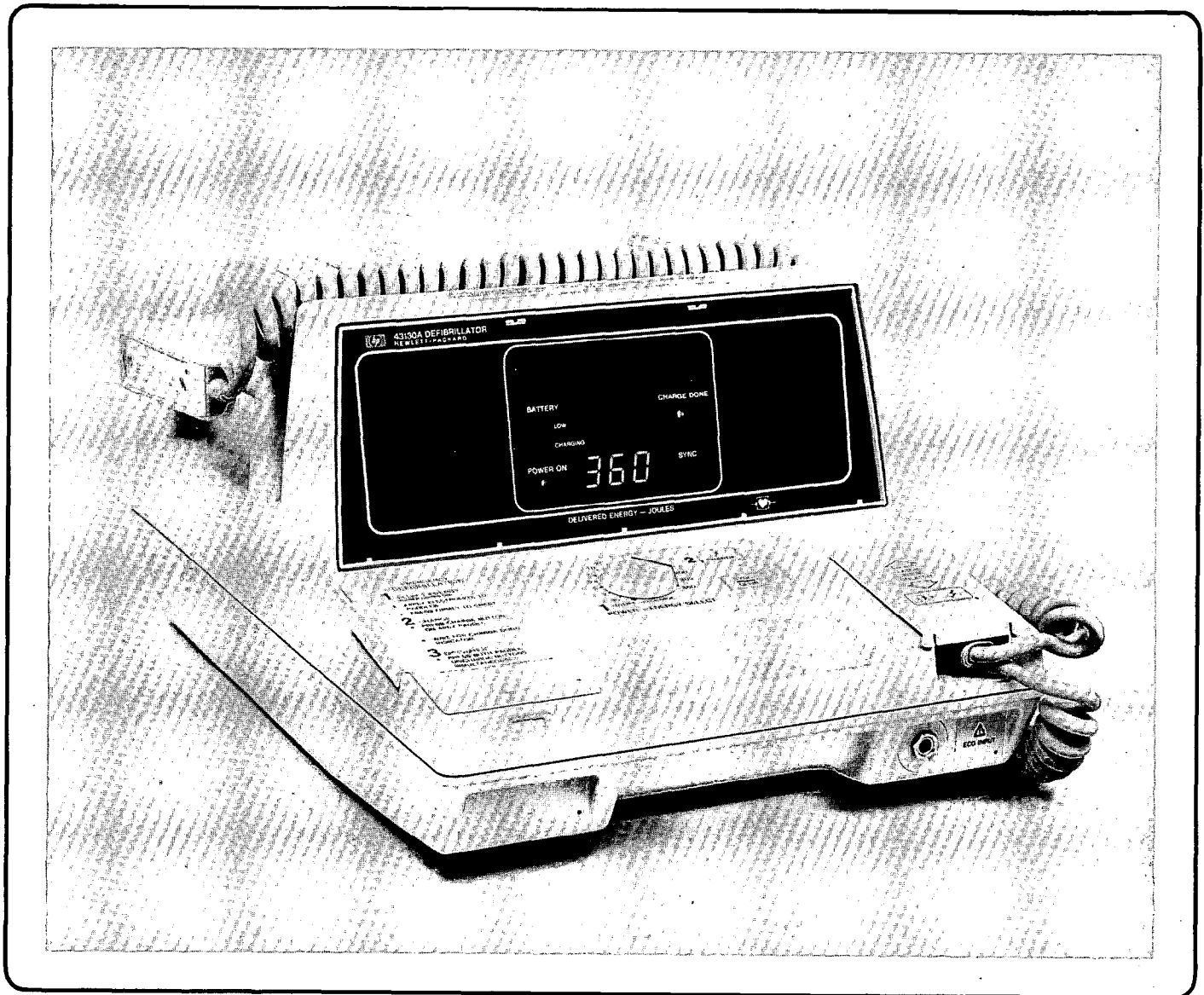




**HEWLETT
PACKARD**

43130A DEFIBRILLATOR



OPERATING GUIDE



ADDENDUM EMERGENCY BACKUP OPERATION

Defibrillators with this label have emergency A C power backup capability. This allows limited operation under most battery failed conditions, as long as the defibrillator is connected to the A C power line. The defibrillator will also operate if the battery is removed and the instrument is connected to the A C power line.

When operating the instrument in this mode some performance differences will be observed:

1. The time to charge the defibrillator to the maximum energy level (360 joules) will be approximately 20 to 30 seconds. Normal charge time with a fully charged battery is less than ten seconds.
2. During defibrillator charging, flickering of the CRT display will be evident.



43130A DEFIBRILLATOR

OPERATING GUIDE

43130-91908

DO: Read the OPERATING GUIDE before operating the instrument

Exercise CAUTION when using the instrument

Keep a battery installed in the instrument at all times

Keep the battery charging during standby periods

Recharge the battery when "LOW BATTERY" condition occurs

DON'T: Open the instrument case

Use the defibrillator in a flammable atmosphere

Allow excess electrolyte paste or gel to accumulate

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INTRODUCTION

This Operating Guide provides installation, operational, and basic maintenance instructions for the safe use and proper care of the Hewlett-Packard Model 43130A Defibrillator. **BEFORE USING THE INSTRUMENT, READ THIS MANUAL AND BECOME THOROUGHLY FAMILIAR WITH ITS CONTENTS.**

SAFETY CONSIDERATIONS

The HP 43130A stores high voltage energy and is capable of delivering up to 360 joules of DC energy to a 50 ohm impedance. Disconnecting the Model 43130A from an AC outlet will not remove power; the instrument is battery-powered, meaning that the ENERGY SELECT control must also be placed in the OFF position. In order to disarm a charged unit, turn the ENERGY SELECT control to the ON or OFF positions, or place the paddles in their holders and depress both DISCHARGE buttons. As a safety feature, the HP 43130A is designed to automatically discharge internally if it has been left charged for more than 60 seconds.

The HP 43130A is designed with all-plastic handles and controls to minimize shock hazard. When not plugged into an AC line, it is a battery-powered instrument with no reference to earth ground, and small static charges may be generated during defibrillator discharges. These static charges present a minor shock potential to the operator, but **ONLY** through the exposed metal surfaces. Avoid touching these surfaces during defibrillator discharge.

Medical electronic equipment which may not incorporate defibrillation protection, e.g., blood flow meters, should be disconnected from the patient during defibrillation discharge.

Never touch the bed, the patient, or any equipment connected to the patient (e.g., patient leads) during defibrillation. Fluids such as Ringer's saline solution and blood are excellent electrical conductors; to avoid creating potentially dangerous electrical paths, keep the 43130A and the immediate area clean and dry at all times.

NEVER open the instrument case; there are no operator controls inside and dangerous high voltages may be exposed. Refer servicing to qualified service personnel.

1 GENERAL INFORMATION

DO NOT use the defibrillator in a flammable atmosphere (i.e. oxygen tents or other areas of concentrated flammable anesthetics). Avoid using portable or emergency vehicle-mounted defibrillators immediately near the site of an automobile wreck - spilled gasoline and puddles of water present extremely dangerous explosion and shock hazards. Contact your local Hewlett-Packard sales or service engineer when any unanswered questions arise concerning safe operation of the HP Defibrillator.

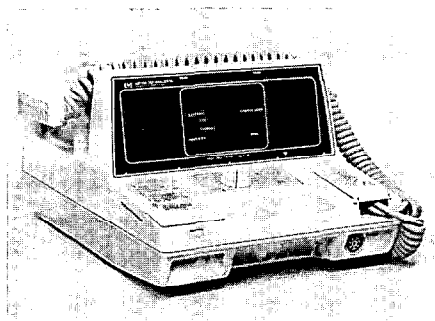
ABOUT THE HP 43130A DEFIBRILLATOR

Your Hewlett-Packard 43130A is a DC defibrillator only, it does not contain its own ECG monitor or strip chart recorder. ECG input for synchronized cardioversion must be provided from an external monitoring system. Energy is selectable from 2 to 360 joules (calibrated for 50 ohms impedance) in 14 discrete steps.

The HP 43130A operates from either AC line power or the integrated rechargeable battery. The fully charged battery is capable of providing fifty 360 joule discharges. An indicator on the front panel lights when the defibrillator is connected to AC power and the battery is charging. A second indicator will light indicating a "LOW BATTERY".

WARNING: PACEMAKER PATIENTS. Rate meters may continue to count the pacemaker rates during occurrences of cardiac arrest or some arrhythmias. Do not rely entirely upon rate meter alarms. Keep pacemaker patients under close surveillance.

The compact, lightweight instrument design, along with battery operation, permit use of the defibrillator in portable applications. The optional accessories pouch provides convenient storage for Redux® paste or defibrillator pads.



Model 43130A

SELF DIAGNOSTICS

The HP 43130A Defibrillator uses microprocessor technology to control and monitor system operation. This advanced design enables the unit to perform a self-diagnostic routine.

Critical circuits within the unit's defibrillator section are monitored and checked periodically during operation. Each time the instrument power is turned ON, proper operation of these circuits is verified and the DELIVERED ENERGY display will briefly flash "HP" and "888". Should a problem be detected, an appropriate ERROR message will be generated on the digital display. The defibrillator should immediately be turned OFF and service personnel notified should an ERROR condition arise.

DEFIBRILLATOR CHARGE TIME

The defibrillator will charge to 360 joules in less than 10 seconds, when powered from a fully charged battery. After several full energy discharges on battery power, the charge time may become slightly longer.

OPERATING ENVIRONMENT

The location of your HP 43130A should be reasonably free from vibration, dust, corrosive or explosive vapors or gases, extreme temperature, and excessive humidity. The operating environment limits for the HP 43130A, including all options, are:

Temperature: 0° C to 55° C
Relative Humidity: 5% to 95%
Altitude: 4,600 m maximum

The instrument may exhibit decreased useable battery capacity (i.e. less than 2.5 hours monitoring time available from a fully charged battery) when operated outside these temperature limits. This condition will only be seen during use outside of the listed temperature limits; normal battery performance will resume when returned to standard operating temperatures.

Temperature while charging battery: +15° C to +35° C

The battery may not reach 100% full charge (using either direct AC power or the Model 43190A or 43192A Power Converters) if charged at temperatures below +15° C. If charged repeatedly at temperatures exceeding +15° C. If charged repeatedly at temperatures exceeding +35° C, the useful life of the battery will be limited.

1 GENERAL INFORMATION

NOTE: As with all electronic equipment, radio frequency interference between the defibrillator or power converter and any existing radio transmitting or receiving equipment at the installation site or in a vehicle, should be evaluated carefully and any limitations noted before the equipment is placed in service. Hewlett-Packard assumes no liability for failures resulting from RF interference between HP medical electronics and any radio frequency generating equipment.

STORAGE AND SHIPMENT ENVIRONMENT

The storage and shipping environment limits for the 43130A, including all options, are:

Temperature: -40° C to 75° C
Relative Humidity: 5% to 95% (40° C)
Altitude: 15,300 m maximum.

SPECIFICATIONS

DEFIBRILLATOR

Waveform: Lown Waveform (Damped sinusoidal).

Output Energy (delivered): 2, 3, 5, 7, 10, 20, 30, 50, 70, 100, 150, 200, 300, and 360 joules.

Charge Control: Push-button on APEX paddle and on front panel.

Charge Time: Less than 10 seconds to 360 joules when powered by a fully charged battery.

Delivered Energy Display: digital display indicates energy which will be delivered into 50 ohms impedance.

Armed Indicators: Charge done tone, charge done lamp on apex paddle, and delivered energy display.

Safety Interlock: Output energy limited to 50 joules when internal paddles are installed.

Paddles: Standard paddles are anterior/anterior, adult and pediatric. Adult electrodes slide off to expose pediatric electrodes. Full range of anterior/posterior and internal paddles are available.

Synchronizer: SYNC indicator on front panel lights while in synchronous mode. There is an audible beep with each detected R-wave, while a marker pulse on the monitor indicates discharge point. Upon activation, discharge occurs within 30ms of marker pulse.

SIZE AND WEIGHT

Dimensions: 21.5 cm H x 29.8 cm W x 43.2 cm L (8.4" x 11.7" x 17")

Weight: 9 kg (20 lb.)

BATTERIES

Type: 2.5 Ampere-hour rechargeable starved electrolyte sealed lead acid.

Charge Time: 2 hours for 90% capacity (from depleted state).

Capacity: Fifty (50) full energy (360 joule) discharges.

Charging Indicator: An LED on the front panel lights when the battery is charging. A second LED indicates limited available battery capacity.

Maximum Power Consumption: 100 VA

STANDARD ACCESORIES

Redux® Paste, 5 oz., part number 651-1008

SYNC Cable, part number 8120-1022

Operating Manual

Operating Instruction Card

ORDERING INFORMATION

OPTIONS

- | | | | |
|------------|---|------------|---|
| C02 | Add 6.0 cm Internal Paddle Set. Includes handle set, part number 14990B, and 6.0 cm diameter electrode set, part number 14995A. | J02 | IEC Lead Set. |
| C03 | Add Anterior/Posterior Paddle Set. Includes paddle set, part number 14412D. | K01 | Add Accessories Pouch, P/N 43100-69500. |
| C04 | Add 7.5 cm Internal Paddle Set. Includes handle set, part number 14990B, and 7.5 cm diameter adult electrode set, part number 14993A. | K02 | Defibrillator Carrying Case. |
| C05 | Add 4.5 cm Internal Paddle Set. Includes handle set, part number 14990B, and 4.5 cm diameter pediatric electrode set, part number 14992A. | L01 | French Language |
| C06 | Add 2.8 cm Internal Paddle Set. Includes handle set, part number 14990B, and 2.8 cm diameter infant electrode set, part number 14994A. | L02 | German Language |
| C07 | Technical Documentation Option; includes HP 43130A Service Manual, part number 43130-91909. | L03 | Dutch Language |
| C09 | Delete Anterior/Anterior Paddle Set. | L04 | Spanish Language |
| | | L05 | Italian Language |
| | | L06 | Swedish Language |
| | | N01 | CSA Approval |
| | | N02 | IEC/VDE Approval |
| | | N05 | NEMKO Approval |
| | | Z01 | 50Hz Power |
| | | Z02 | 100V Power |
| | | Z05 | 230V Power |
| | | 900 | UK Power Cord |
| | | 901 | Australian Power Cord |
| | | 902 | European Power Cord |
| | | 906 | Swiss Power Cord |
| | | 917 | South Africa Power Cord |

NOTES: Standard Power is 120V/60Hz.

* Standard language is English.

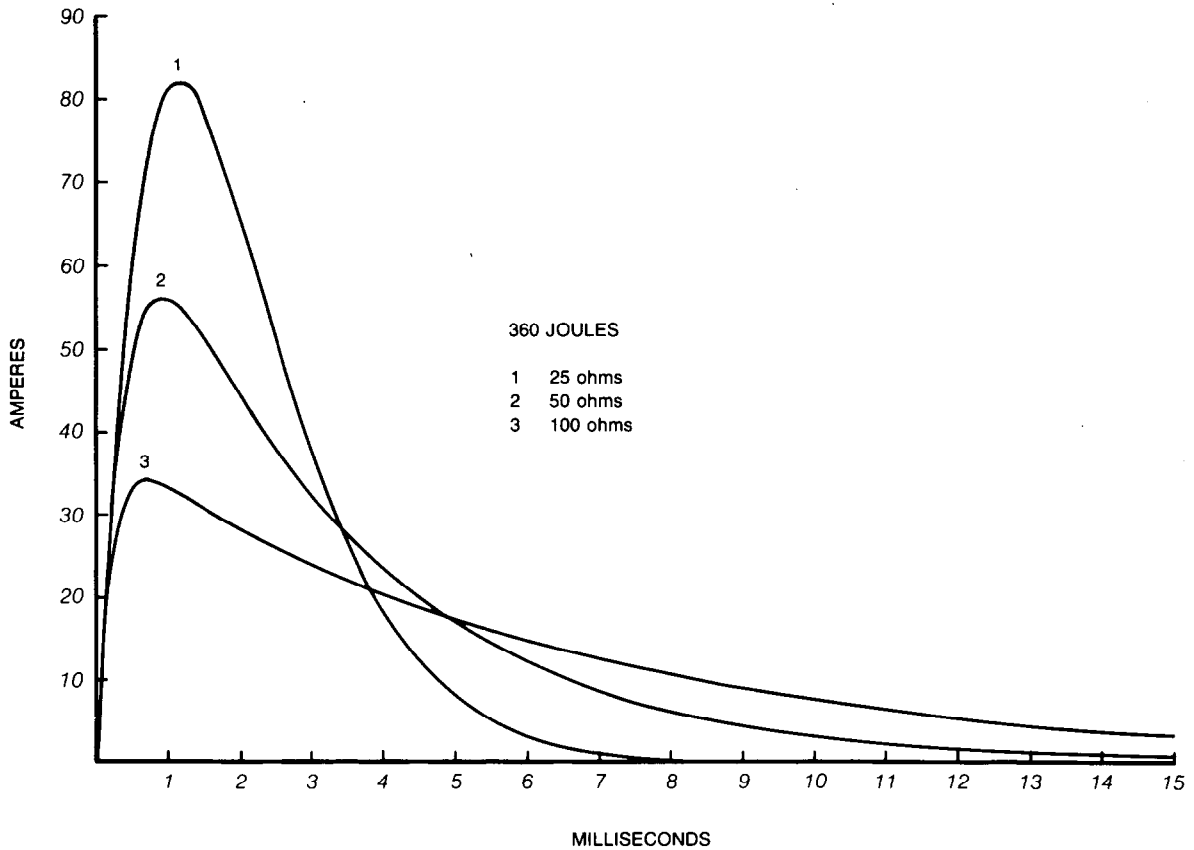
* Standard Power cord is U.S.

1 GENERAL INFORMATION

DEFIBRILLATOR ENERGY OUTPUT INFORMATION

The HP 43130A Defibrillator stores sufficient energy to discharge 360 joules into a 50 ohm impedance. However, the actual energy delivered into a patient is a function of the total impedance to the defibrillator discharge. As a practical matter, the operator controls the largest portion of this impedance by the quality of skin preparation, paddle placement, and pressure. If sufficient electrolyte is utilized, and pressure of 10-12 kilograms per paddle applied, then an impedance of approximately 50 ohms would be expected with the average patient. In this case, the energy delivered to the patient would equal the energy setting selected.

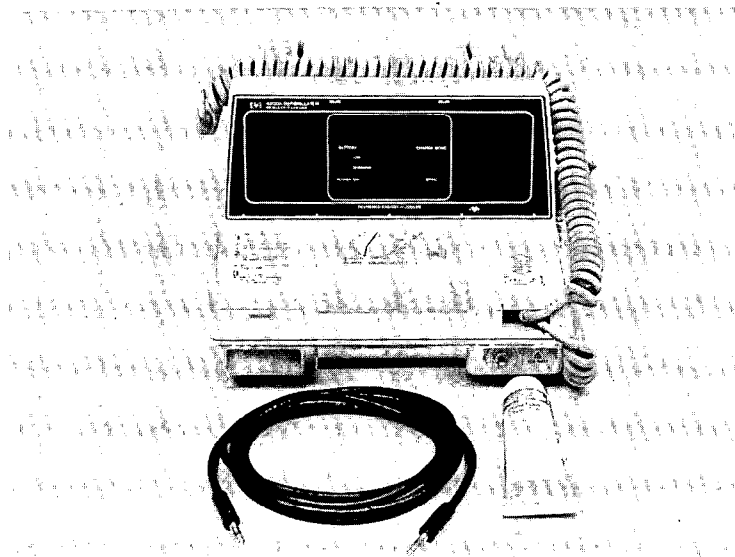
The output waveforms shown in the figure below indicate that with decreasing impedance, higher peak current is obtained. Recent clinical evidence indicates that the peak current value must reach a critical threshold for defibrillation, and should therefore be maximized. The primary method available to the operator to accomplish this, is proper paddle application technique.



INITIAL INSPECTION

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 completeness and the instrument has been checked for mechanical and electrical integrity. The contents of the shipment should be as shown below; procedures for installation and initial checks are presented in Section 5.

If the contents are incomplete, if there is mechanical damage or if the instrument does not pass its electrical self-test (described earlier), notify your local Hewlett-Packard sales office. If the shipping container is damaged, notify the carrier also.



1 GENERAL INFORMATION

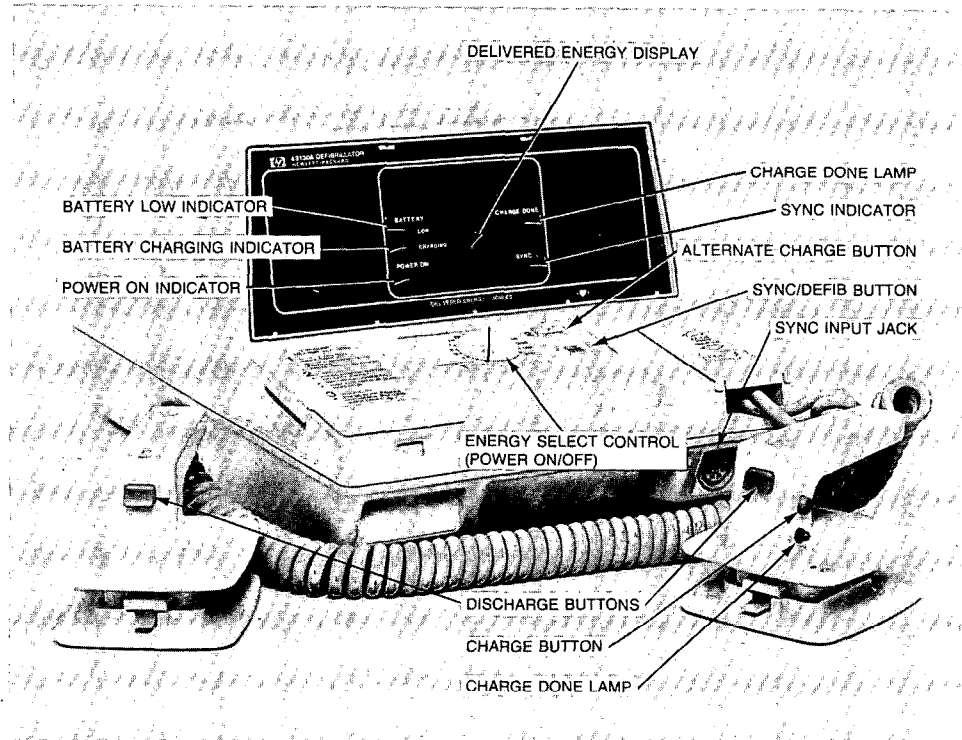
PACKAGING

Containers and materials used for original shipment of your HP 43130A are specifically designed for the instrument and are not readily available through Hewlett-Packard sales offices; it is recommended that you keep the packing materials for future use. If the instrument is returned to Hewlett-Packard for servicing, attach a tag indicating the product model number, serial number, return address, and a description of the problems encountered and service required. Mark the container FRAGILE to ensure careful handling. In every correspondence, refer to the instrument by product number and full serial number (e.g. HP43130A, serial number 2500A00000).

Follow these general instructions when re-packaging with commercially available materials:

- Wrap the instrument in heavy cushioning material.
- Use a strong shipping container. A double-wall carton made of 350 pound test material is adequate.
- Use enough shock absorbing material (3 or 4 inch layer) around all sides of the instrument to provide firm cushioning and to prevent movement inside the container. Protect the control panel with cardboard.
- Seal the shipping container securely.

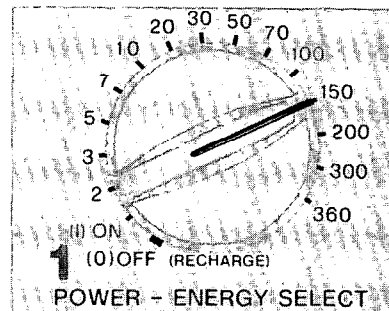
OPERATING CONTROLS and INDICATORS • SECTION 2



Model 43130A Defibrillator

1. ENERGY SELECT control

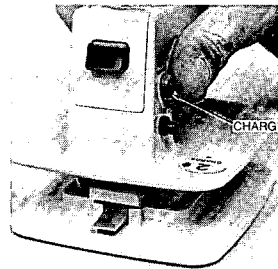
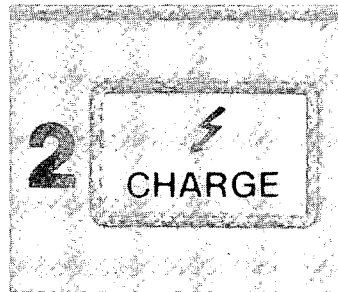
The ENERGY SELECT control turns the instrument power ON and OFF and also selects the desired energy level in 14 discrete steps. Switch positions are OFF, ON, 2, 3, 5, 7, 10, 20, 30, 50, 70, 100, 150, 200, 300, and 360 joules (watt-seconds).



2 OPERATING CONTROLS and INDICATORS

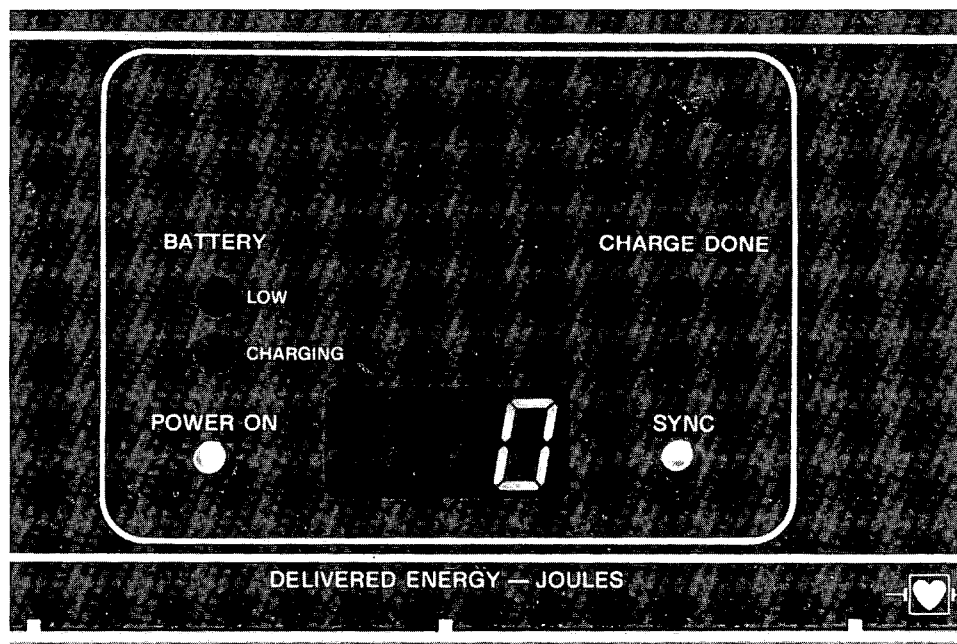
2. CHARGE button

Press the CHARGE button on either the APEX paddle or the front panel to charge the defibrillator to the level selected with the ENERGY SELECT control. When the CHARGE button is pressed, the defibrillator charges to the selected level in 10 seconds or less when operated from a fully charged battery. To change the selected energy level AFTER the CHARGE button has been pressed, simply reset the ENERGY SELECT control. The defibrillator will automatically charge to the new level.



3. DELIVERED ENERGY display

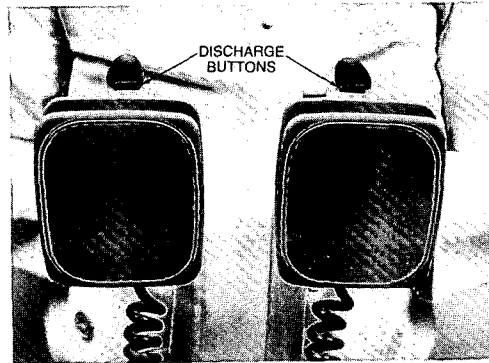
The digital display on the front panel displays the energy available for defibrillator discharge. With the defibrillator disarmed, this DELIVERED ENERGY display indicates "0".



OPERATING CONTROLS and INDICATORS **2**

4. DISCHARGE buttons

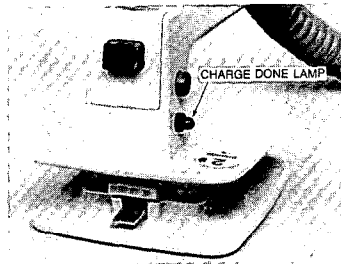
Each paddle has a DISCHARGE button located near the forward end of the handle. Press and briefly hold both buttons simultaneously to discharge the defibrillator.



5. CHARGE DONE indicators

- "CHARGE DONE" lamps, located on the APEX paddle and front panel, light and a "CHARGE DONE" tone sounds when the selected energy level has been reached. The DELIVERED ENERGY display indicates the actual energy available.

NOTE: The "CHARGE DONE" tone may be eliminated by, if desired, by removing a single diode. Refer to the HP 43130A Service Manual for further information.



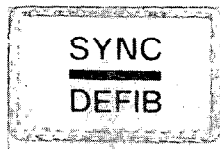
2 OPERATING CONTROLS and INDICATORS

6. SYNC/DEFIB button

Pressing the SYNC/DEFIB button on the front panel changes the operating mode of the defibrillator. In DEFIB (normal) mode, the unit discharges immediately when both discharge buttons are pressed. In SYNC mode, the unit synchronizes discharge with the next detected R-wave after both discharge buttons are pressed. This mode is typically used for cardioversion procedures with the defibrillator connected to an external monitor.

The instrument defaults to DEFIB (normal) mode when power is turned ON. For synchronized operation, press the SYNC/DEFIB button once; the "SYNC" indicator on the front panel lights while in SYNC mode. To return to normal DEFIB mode for instant discharge, press the SYNC/DEFIB button again.

The HP 43130A is designed to remain in SYNC mode after discharge (until the operator chooses to return the instrument to DEFIB mode) to avoid inadvertent non-synchronized shock delivery during cardioversion procedures. This design may differ from other manufacturers' instruments. Become familiar with the SYNC-DEFIB operation of each defibrillator you use.



7. "POWER ON" LED

The "POWER ON" indicator lights when the instrument is turned on.



8. "SYNC" LED

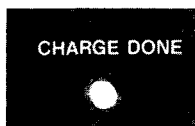
The "SYNC" indicator lights when the instrument is placed in synchronized (SYNC) mode of operation. It flashes OFF with each detected R-wave.



OPERATING CONTROLS and INDICATORS **2**

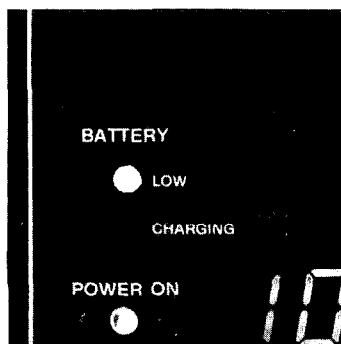
9. "CHARGE DONE" LED

The "CHARGE DONE" indicator lights when the defibrillator is charged to the selected energy level and ready for discharge.



10. "LOW BATTERY" LED

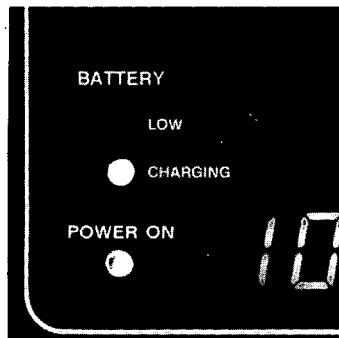
The "LOW BATTERY" indicator lights when the battery runs low and warns that a limited number of energy shocks are available. The defibrillator may be returned to AC line power (plugged in) at any time for unlimited use.



11. "BATTERY CHARGING" LED

The "BATTERY CHARGING" LED indicates that the defibrillator battery is being charged. It is lit whenever the instrument is connected to a suitable wall outlet supplying AC power and the power line switch located at the rear of the unit (if installed) is ON. To ensure that the unit has sufficient battery power to accommodate emergency episodes, and to maximize the useful life of the battery, it is recommended that the instrument remain connected to AC power during standby periods.

2 OPERATING CONTROLS and INDICATORS



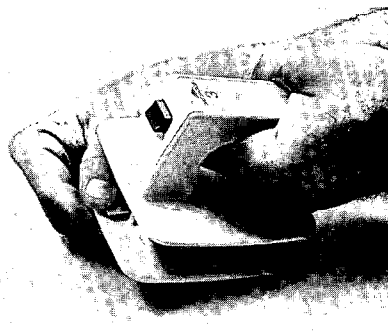
12. BATTERY PACK

The replaceable battery pack is located inside a compartment on the underside of the unit. The compartment lid is held closed by two rotating latches. (Refer to Section 6 for information regarding battery pack replacement, storage, and care.)

13. PADDLES

The HP 43130A paddle set includes both adult and pediatric electrode sizes. The adult electrodes are always exposed. To use the pediatric electrodes, remove the adult electrodes from each paddle by pressing down on the adapter locking lever and sliding the adult electrode forward. To replace the adult electrode, simply slide it back into place, making sure that the locking lever engages.

NOTE: The adult electrodes should be installed whenever the defibrillator is discharged with the paddles in their holders. If adult electrodes are not used, the paddles must be pressed firmly against the metal test contacts to avoid damage.



OPERATING CONTROLS and INDICATORS **2**

14. INTERCHANGEABLE PADDLE CONNECTOR

Located at the front right of the unit, the paddle connector enables quick, easy changing of the various paddle sets available for use with the 43130A. (See page 5 for a description of available paddle sets and ordering information.)

To disconnect a paddle set from the defibrillator, slide the latch cover (A) toward you, rock the connector forward and back, and pull the connector block straight up. To install an alternate paddle set, press the paddle connector down into place, and slide the latch back.

15. POWER CORD STORAGE RECESS

The power cord may be quickly and easily coiled into the recessed compartment located in the rear of the instrument case, when transport is necessary. The compartment "captures" the cord, keeping it out of the way during an emergency episode, and allows easy removal when the unit is returned to AC line power. The power cord plugs into the receptacle located in this compartment, and may be secured with the power cord retainer included in the accessory kit.

16. ECG/SYNC Input

The standard phone jack allows the HP 43130A to be synchronized with the signal from an HP bedside monitor. Connect the SYNC cable to the ECG or SYNC output of the monitor and to the ECG/SYNC input on the HP 43130A. The defibrillator will synchronize from the signal, return a "marker pulse" to the monitor for verification, and time the energy discharge to occur at the trigger point.

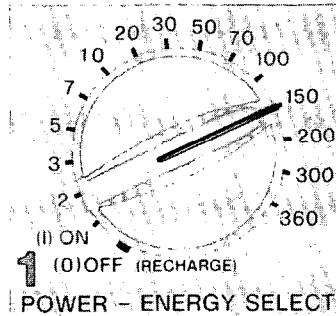
2 OPERATING CONTROLS and INDICATORS

NOTES

EMERGENCY DEFIBRILLATION PROCEDURES • SECTION 3

SELECT ENERGY

Turn the ENERGY SELECT control to the desired energy level. (This turns the instrument power on automatically.)



PREPARE PADDLES

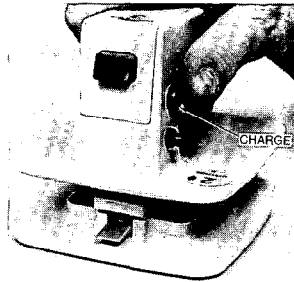
- Remove the paddles from their holders by grasping the handles and lifting straight up.
- Apply a liberal amount of Redux® paste to the electrode surface of each paddle, or use defibrillator pads. **TO AVOID RISK OF ELECTRICAL SHOCK TO THE OPERATOR, DO NOT ALLOW PASTE TO ACCUMULATE ON THE HANDS OR THE PADDLE HANDLES.**
- Gently rub the electrode surfaces together to evenly distribute the applied paste.

APPLY PADDLES TO CHEST

- Apply the paddles firmly to the anterior wall of the chest. The left (STERNUM) paddle should be placed to the right of the sternum just below the clavicle; the right (APEX) paddle should be placed on the chest wall, just below and to the left of the left nipple, in the anterior-axillary line.
- Rub the paddles slightly against the skin to maximize the paddle-to-patient contact. **DO NOT ALLOW PASTE TO ACCUMULATE BETWEEN THE PADDLE ELECTRODES ON THE CHEST WALL - THIS COULD CAUSE BURNS.**
- Recommended applied pressure is 10-12 kg (22-25 lb) per paddle.

3 EMERGENCY DEFIBRILLATION PROCEDURES

CHARGE DEFIBRILLATOR



- Press the CHARGE button on either the right (APEX) paddle or on the instrument front panel.
- When the "CHARGE DONE" tone sounds, and the "CHARGE DONE" lamps light, the DELIVERED ENERGY display will indicate the available energy.

NOTE: Should you need to disarm the charged defibrillator (if countershock is not needed), turn the ENERGY SELECT control to the ON position. Any stored energy will be discharged internally and the monitor DELIVERED ENERGY display will return to "0".

NOTE: If the defibrillator will not charge, verify proper setting of the ENERGY SELECT control. If it is correct, turn the ENERGY SELECT control to OFF, and then back to the desired energy setting and press the CHARGE button again. If the unit remains unable to charge, turn the ENERGY SELECT control to the ON or OFF position and use a back-up defibrillator. Alert appropriate service personnel as soon as possible.

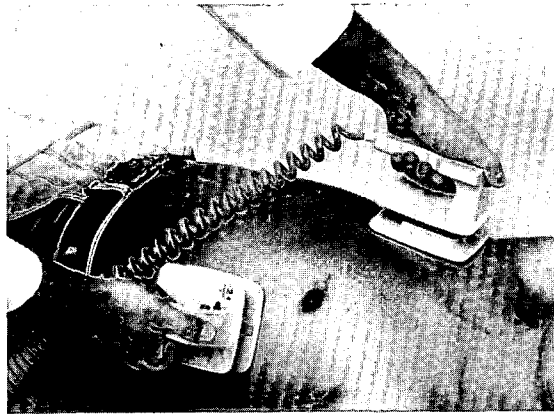
As a safety feature, if the defibrillator is not discharged within 60 seconds of reaching the selected energy level, it will automatically discharge the stored energy internally. During the ten seconds just prior to this internal disarm, the "CHARGE DONE" tone will beep intermittently. When the internal discharge occurs, the "CHARGE DONE" tone will stop, the "CHARGE DONE" lamp will go off, and the DELIVERED ENERGY display will return to "0".

TO RESET SELECTED ENERGY LEVEL

To increase or decrease the selected energy level after the CHARGE button has been pressed, simply move the ENERGY SELECT control to the new energy level, and wait for the CHARGE DONE tone and lamp to activate.

DISCHARGE

- Briefly adjust paddle pressure and placement to optimize patient contact.
- Verify that no one is in contact with the patient, monitoring cable or leads, bed rails, or any other potential current pathway.
- Call out "CLEAR" to alert other personnel to stand clear of the patient.
- Press and briefly hold both DISCHARGE buttons (one on each paddle) simultaneously, to deliver energy to the patient.



NOTE: If the defibrillator does not discharge, press the CHARGE button again, wait for the "CHARGE DONE" tone, and press the DISCHARGE buttons again. If it still will not discharge, turn the ENERGY SELECT control to the ON or OFF position, and use a back-up defibrillator. Alert appropriate service personnel immediately.

AFTER USE

- Turn the ENERGY SELECT control to OFF.
- Return the instrument to its storage location, and plug the power cord into an AC power outlet. Verify that the "BATTERY CHARGING" LED lights.
- Clean all paddles, controls, and cables as necessary. (Refer to Section 6 for detailed cleaning information.)
- Check that adequate remaining recorder paper and electrolyte paste or defibrillator pads are available for the next use of the defibrillator.

3 EMERGENCY DEFIBRILLATION PROCEDURES

NOTES

ELECTIVE CARADIOVERSION • SECTION 4

Certain arrhythmias require synchronizing defibrillator discharge with the ECG R-wave to avoid inducing ventricular fibrillation. In this case, a synchronizing (SYNC) circuit within the instrument detects the patient's R-waves. When the discharge buttons are pressed, the unit will discharge with the next detected R-wave, thus avoiding the vulnerable T-wave segment of the cardiac cycle.

When the HP 43130A is placed in SYNC mode for synchronized cardioversion, a marker pulse is superimposed on the ECG as it appears on the monitor to indicate the point in the cardiac cycle where discharge will occur.

- Place the ENERGY SELECT control in the ON position.
- Select desired ECG lead on the monitor. Connect the ECG/SYNC output jack to the ECG/SYNC input jack on the HP 43130A using cable part number 8120-1022.
- Press the SYNC/DEFIB button once to place the HP 43130A in SYNC mode. The "SYNC" indicator will light on the front panel and will flash OFF with each detected R-wave.
- Always inspect the displayed ECG before delivering the countershock, and verify that a marker pulse (indicating discharge point) appears only with each R-wave. Should a marker pulse not appear, or if a marker pulse is viewed on the T-wave segment of the ECG, adjust the ECG size until the marker pulse appears only with each R-wave. Select a different lead or adjust electrode placement, if necessary, to improve ECG R-wave quality.

VERIFY DEFIBRILLATOR OPERATION BEFORE PROCEEDING

Perform the following brief test to ensure proper defibrillator performance:

- Place the ENERGY SELECT control in the "100" joules position.
- Verify that the adult paddle electrodes are installed.
- Leaving the paddles in their holders, press either CHARGE button. Wait for the "CHARGE DONE" indicators, and for the DELIVERED ENERGY display to read "100" joules.
- With the paddles pressed firmly into their holders, press and briefly hold both discharge buttons simultaneously; the defibrillator will discharge with the next detected R-wave. After discharge, the DELIVERED ENERGY display should indicate "100" joules, the actual measured energy delivered to the internal test-load.

4 ELECTIVE CARIOVERSION

SELECT ENERGY

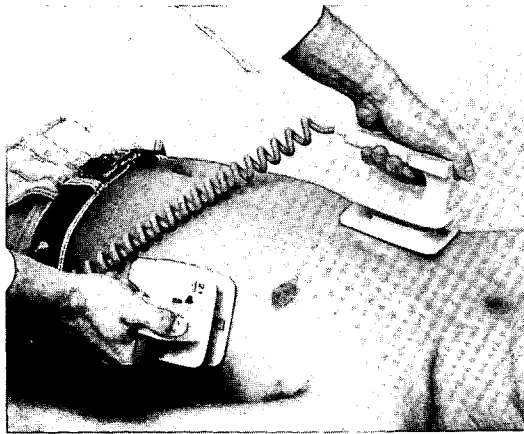
- Select the desired energy level with the ENERGY SELECT control.

PREPARE PADDLES

- Remove paddles from their holders by grasping the handles and lifting straight up.
- Apply a liberal amount of REDUX® paste to the electrode surface on each paddle or use defibrillator pads. TO AVOID RISK OF ELECTRICAL SHOCK TO THE OPERATOR, DO NOT ALLOW PASTE TO ACCUMULATE ON THE HANDS OR THE PADDLE HANDLES.
- Gently rub the electrode surfaces together to evenly distribute the applied paste.

APPLY PADDLES TO CHEST

- Apply the paddles firmly to the anterior wall of the chest. The left (STERNUM) paddle should be placed to the right of the sternum just below the clavicle; the right (APEX) paddle should be placed on the chest wall, just below and to the left of the left nipple, in the anterior-axillary line.



- Rub the paddles slightly against the skin to maximize the paddle-to-patient contact. DO NOT ALLOW PASTE TO ACCUMULATE BETWEEN THE PADDLE ELECTRODES ON THE CHEST WALL - THIS COULD CAUSE BURNS.
- Recommended applied pressure is 10-12 kg (22-25 lb) per paddle.

CHARGE DEFIBRILLATOR

- Press the CHARGE button on either the right (APEX) paddle or on the instrument front panel.
- When the "CHARGE DONE" tone sounds and the "CHARGE DONE" lamp lights, the DELIVERED ENERGY display on the monitor will indicate the available energy.

NOTE: Should you need to disarm the charged defibrillator (if countershock is not needed), turn the ENERGY SELECT control to the ON position. Any stored energy will be discharged internally and the monitor DELIVERED ENERGY display will return to "0".

NOTE: If the defibrillator does not charge, verify proper setting of the ENERGY SELECT control. If it is correct, turn the ENERGY SELECT control to OFF, and then back to the desired energy setting, reset the SYNC/DEFIB and ECG SIZE controls, and press the CHARGE button again. If the unit remains unable to charge, turn the ENERGY SELECT control to OFF and use a back-up defibrillator. Alert appropriate service personnel.

As a safety feature, if the defibrillator is not discharged within 60 seconds of reaching the selected energy level, it will automatically discharge the stored energy internally. During the ten seconds just prior to this internal disarm, the "CHARGE DONE" tone will beep intermittently. When the internal discharge is complete, the "CHARGE DONE" tone will terminate, the "CHARGE DONE" lamp will go off, the recorder will annotate "DISARMED", and the monitor DELIVERED ENERGY display will return to "0".

TO RESET SELECTED ENERGY LEVEL

To increase or decrease the selected energy level after the CHARGE button has been pressed, simply move the ENERGY SELECT control to the new energy level, and wait for the CHARGE DONE tone.

4 ELECTIVE CARADIOVERSION

DISCHARGE

- Verify again that the ECG waveform is stable, and that a marker pulse appears ONLY with each R-wave of the cardiac cycle.
- Briefly adjust paddle pressure and placement to optimize contact.
- Press and briefly hold both DISCHARGE buttons (one on each paddle) simultaneously. The defibrillator will discharge with the next detected R-wave.
- If additional countershocks are required, readjust the ENERGY SELECT control as necessary, and repeat the above procedure.

NOTE: If the defibrillator does not discharge press the CHARGE button again, wait for the "CHARGE DONE" tone, and press the DISCHARGE buttons again. If it still will not discharge, turn the ENERGY SELECT control to the ON or OFF position, and use a back-up defibrillator. Alert appropriate service personnel immediately.

AFTER USE

- Turn the ENERGY SELECT control to OFF.
- Return the instrument to its storage location, and plug the power cord into an AC power outlet. Verify that the "BATTERY CHARGING" LED lights.
- Clean all paddles, controls, and cables as necessary. (Refer to Section 6 for information on cleaning the defibrillator.)
- Check that adequate remaining recorder paper and electrolyte paste or defibrillator pads are available for the next use of the defibrillator.

CHECKOUT PROCEDURE • SECTION 5

The following procedure allows complete functional inspection of the Model 43130A Defibrillator/Monitor. A simplified inspection routine for daily and weekly testing is included in Section 7.

- Plug the power cord into suitable AC power outlet and check that the power line switch located at the rear of the unit (if installed) is on.
- Place the ENERGY SELECT control in the ON position. The POWER ON indicator will light.
- Verify that the adult paddle electrodes are installed.
- Place the ENERGY SELECT control in the 100 joules position. Leaving the paddles in their holders, press either CHARGE button. The "CHARGE DONE" tone should sound and the "CHARGE DONE" lamp should light within 10 seconds when operated with a fully charged battery, and the DELIVERED ENERGY display should register "100" joules.
- **WARNING:** Ensure that hands are kept clear of the paddle electrode edges; use thumbs to depress DISCHARGE buttons.
- Grasp the paddle handles, and without removing the paddles from their holders, press both DISCHARGE buttons simultaneously. The DELIVERED ENERGY display will indicate the actual energy (+/- 10%) delivered to the the internal 50ohm test load.

The defibrillator is ready for use if it passes the above checklist.

CAUTION: DO NOT DISCHARGE THE DEFIBRILLATOR WITH THE PADDLES SHORTED TOGETHER. TO DO SO CAN CAUSE BURNING AND PITTING OF THE METAL PADDLE CONTACTS.

WARNING: AVOID OPEN PADDLE DISCHARGES. DANGEROUS HIGH VOLTAGE EXISTS ON THE PADDLES WHEN THE DEFIBRILLATOR IS DISCHARGED. CONTACT WITH THIS HIGH VOLTAGE COULD CAUSE DEATH OR SERIOUS INJURY.

5 CHECKOUT PROCEDURES

NOTES

BATTERY INFORMATION

The following information will help you gain the most benefit from the lead-acid battery (HP part number 1420-0339) which is used in the HP 43130A defibrillator.

As soon as your new defibrillator arrives, check it out according to the Checkout Procedure (Section 5), and connect it to AC power for at least 24 hours (48 hours or more is preferred). The battery is charged at the factory, but some discharging will occur even when the defibrillator power control is in the "OFF" position, or when the battery is out of the instrument.

To prolong battery life, Hewlett-Packard defibrillators have a feature which turns off the instrument when battery capacity is low. **IMPORTANT:** A battery discharged to the defibrillator shutdown point will still allow immediate AC line power operation. A DEFECTIVE (SHORT-CIRCUIT OR OPEN-CIRCUIT) BATTERY WILL PREVENT THE USE OF THE DEFIBRILLATOR, EVEN WHILE ON AC POWER.

As with most battery-operated equipment, IT IS STRONGLY RECOMMENDED THAT THE DEFIBRILLATOR BE LEFT PLUGGED INTO AC LINE POWER DURING STANDBY PERIODS TO PROVIDE CONSTANT BATTERY CHARGING. Always verify that the "BATTERY CHARGING" indicator is on when the unit is on AC power. The battery does not require periodic discharge cycling maintenance to correct voltage depression or 'memory' problems common with NiCad (nickel-cadmium) batteries.

6 OPERATOR SERVICE

BATTERY CHECK

Hewlett-Packard recommends that the battery (HP part number 1420-0339) capacity be checked periodically (every three months or when questionable it is noticed). Since the 43130A Defibrillator does not include a monitor which provides a convenient method of capacity determination, we recommend that

- 1) for capacity checking the battery be installed in an HP unit with a monitor (Models 43100A, 43110A, 43120A or 43200A), or
- 2) the battery be replaced after being in service one year.

In general, use of this check should not exceed the frequency recommended by Hewlett-Packard, since repeated deep discharges will tend to decrease the battery's total useful life. REMEMBER THAT THE BATTERY SHOULD BE LEFT ON CHARGE WHENEVER POSSIBLE FOR BEST PERFORMANCE AND LIFE.

CHANGING THE BATTERY PACK

- THE HP 43130A MUST HAVE A BATTERY INSTALLED TO OPERATE.
- Place the unit on its back or side.
- Open the battery compartment door by rotating the two latches.
- Unplug the battery cable from the defibrillator.
- Replace with a new battery and secure the compartment door.
- Charge battery for 24 hours before putting into service to achieve maximum battery capacity.

BATTERY STORAGE

Beyond a preliminary full charge, no preparation is required for storage of the battery. A 48-hour charge is sufficient preparation. Batteries should be stored in a cool, dry location.

Lead-acid batteries have a finite shelf life (storage time) before they become non-functional. A lead-acid battery in storage should be recharged for at least 24 hours every six months. This will help ensure the battery does not become excessively discharged while in storage, even though the shelf discharge rate is low. The shelf life is longer with colder temperatures, but do not store below freezing level.

Prolonged storage of the battery off charge could result in an abnormal condition where it will not recharge even when the defibrillator is connected to AC power. The condition (open circuit voltage below about 10.8 volts) could occur if the battery is stored longer than six months without recharging or left in the instrument off charge for more than four months from a fully-charged state. The difference in time is because the instrument draws a small amount of current even when the power switch is off. The diagnosis of this condition is simple. When the unit is plugged into AC line power, the 'BATTERY CHARGING' indicator will flash briefly once approximately every five seconds, and will be accompanied by a relay 'click' within the instrument. The battery must be replaced in this situation.

For best results, observe the battery recharge recommendations which have been added to the shipping carton and battery labels. A label on the shipping carton next to the packing slip provides a date prior to which the instrument should be plugged in and the battery must be recharged. In addition, a caution label on the battery pack states that the battery should be recharged (for at least 24 hours) every six months.

- Observe the same storage environment limits for the battery as suggested for the instrument (Section 1):

Temperature: -40° C to 75° C
Relative Humidity: 50% to 95% (40° C)

NOTE: The battery must be charged if stored below zero C to avoid damage.

6 OPERATOR SERVICE

CLEANING EXTERIOR SURFACES

- The 43130A and its accessories are chemically resistant to common hospital cleaning solutions and non-caustic detergents. Some approved cleaning solutions are:
 - Alcohol
 - Soap and water
 - Chlorine bleach (30ml/l water)
 - Ammonia-based cleaners
- Keep the outside surface of the instrument clean and free of dust and dirt. Clean the paddles thoroughly to prevent build-up of dried electrolyte.
- When alternate paddle sets are used, be especially careful to avoid the accumulation of fluids in the paddle connector well.
- DO NOT allow any fluids to penetrate the instrument case, and avoid pouring fluid on the unit while cleaning. DO NOT use abrasive cleaners or strong solvents such as acetone, or acetone-based compounds.
- DO NOT steam or gas (ETO) sterilize the external paddle set.

NOTE: For information regarding the use and sterilization of HP Internal Handle and Electrode sets, consult the documentation accompanying those products.

These checks are intended to briefly verify proper operation of the 43130A Defibrillator. A test routine incorporating these checks along with visual inspection for mechanical integrity of all cables, paddles, and controls should be performed regularly as indicated below.

EVERY SHIFT

- Verify that the instrument is connected to AC power and that the “BATTERY CHARGING” LED is lit.
- Check for presence of adequate REDUX[®] electrolyte paste or defibrillator pads.

EVERY WEEK

Delivered energy check:

- Place the ENERGY SELECT control in the “100 ” position.
- Verify that the adult paddle electrodes are installed.
- Leaving the paddles in their holders, press either CHARGE button. Wait for the “CHARGE DONE” tone to sound and the “CHARGE DONE” lamp to light and verify that the DELIVERED ENERGY display registers “100” joules.
- **WARNING:** Ensure that hands are kept clear of the paddle electrode edges; use thumbs to depress DISCHARGE buttons.
- Grasp the paddle handles and, leaving the paddles in their holders, press and briefly hold both DISCHARGE buttons simultaneously. The DELIVERED ENERGY display will indicate the actual energy (+/- 10%) delivered into the internal 50ohm test load. Notify service personnel if any delivered energy value other than “100” joules is indicated.

See the HP 43130A SERVICE MANUAL for extensive electrical, operational, and safety tests which should be performed by a qualified Biomedical Electronics Technician (BMET) or equivalent service technician every 6 months.

For more information, call your local HP sales office or East (301) 948-6370 • Midwest (312) 255-9800 • South (404) 955-1500 • West (213) 877-1282; or write: Hewlett-Packard, 1501 Page Mill Road, Palo Alto, California 94304. In Europe, Hewlett-Packard S.A., 7, rue du Bois-du-lan, P.O. Box CH-1217, Meyrin 2, Geneva, Switzerland. In Japan, Yokogawa-Hewlett-Packard Ltd., 29-21, Takaido-Higashi 3-chome, Suginami-ku, Tokyo 168.

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