DEFIBRILLATOR / MONITOR, BATTERY POWERED PM PROCEDURE
(CARDIAC MONITOR DEFIBRILLATOR)
MFG: PHYSIO CONTROL    M/N: LIFEPAK 9

TEST EQUIPMENT NEEDED
DEFIBRILLATOR ANALYZER
ECG SIMULATOR (CAPABLE OF 240-250 BPM OUTPUT)
STOPWATCH
INDEX SIMULATOR
RULE, GRADUATED IN CM/MM (> 7CM)

I. FAMILIARIZATION.
A. If technician is unfamiliar with proper operation of this device and associated components / refer to operators manual.

II. VISUAL INSPECTION.
A. Perform a complete physical inspection of all controls, indicators and displays. Check for cracks, dents, loose or missing hardware.
B. Tighten or replace any loose or missing hardware before proceeding.

III. MAINTENANCE.
A. BATTERY CHARGE. Connect the instrument to the ac power source. Verify that the BATT CHRG legend illuminates.
BATTERY POWER OPERATION, While instrument is turned on, disconnect the power cord from the ac power, verify unit remains on and that the BATT CHRG indicator goes off.
B. Follow manufactures recommended battery replacement procedures, or TRHMC's battery replacement procedure to determine when to change the batteries.
C. Clean print head and paper out sensor.
D. Clean outside surface of Defib. with mild soap and damp cloth.
E. Clean paddles as necessary to remove gel.

IV. PERFORMANCE VERIFICATION.
A. POWER ON SELF CHECKS, Press the green ON pushbutton, verify the ON LED is lit and the HR ALARM, CHARGE & SYNC LED’s flash on, briefly. Verify that within 10 seconds a 1989, PCC is displayed on the CRT for 5 seconds.
B. DEFIBRILLATOR TEST LOAD, insure paddles are secure in paddle storage area of the instrument. Press the charge pushbutton (energy should be selected for 200joules) and wait until instrument reaches full charge. A audible beep should
be heard along with a display indicating 200 JOULES AVAILABLE on CRT. Simultaneously press both paddle discharge pushbuttons to transfer the energy into the test load. Verify that TEST 200 JOULES DELIVERED displays on the CRT and annotates on the recorder.

C. CRT / RECORDER NOISE, Short RED & WHITE leads of patient cable together, set ECG GAIN to X 4.0, select LEAD II. press RECORD to start recorder. Verify the crt and recorder baseline noise is less than 2MM P-P. (PHYSIO SPEC.) Select PADDLES, short the paddles and verify the crt and recorder baseline noise is less than 3MM P-P.(PHYSIO SPEC.) Set ECG GAIN to X 1.0.

D. PADDLE POLARITY, Place the APEX paddle on defib analyzer's LA output (f/ simulated ecg signal). Place the STERNUM paddle on defib. Analyzer's RA output (f/ simulated ECG signal). Turn defib. Analyzer ON and select the simulated ECG output mode. Verify a positive going QRS waveform is displayed on the CRT.

E. LEAD SELECT, select lead configurations of LEAD I, II & III and verify that a ECG signal is present on all leads (w/ ECG simulator connected to instrument, normal-sinu - rhythm @ 60 BPM).

F. RECORDER SPEED / BASELINE CENTERING,press the RECORD pushbutton (insure paper is in the recorder) to start recording. Let the recorder run for about 10 sec. Then select STD ON LEAD SELECT. Let recorder run for an additional 10 sec. Press the RECORD pushbutton to stop. Measure the distance between the peaks of the recorded ecg trace. Verify distance between consecutive peaks is 25 MM +/- 2MM (PHYSIO SPEC.) Measure the baseline centering of the recorded std trace. Verify that it is centered within +/- 1.5 MM.

G. ECG DISPLAY, With the selected lead set @ STD, verify that the baseline display on the crt is level within +/- 1MM from end to end and is 6.0 CM +/- .5 CM from the bottom of the bezel.

H. 1 MV CAL, PRESS THE RECORD PUSHBUTTON. PRESS THE 1 MV CAL PUSHBUTTON ON THE REAR PANEL ONCE. VERIFY THAT A 1.0 CM +/- .5 MM CAL. PULSE WITH LESS THAN .5MM OVERSHOOT IS RECORDED. APPROX. 8 SECONDS DELAY OF RECORDED SIGNAL. (PHYSIO SPEC.)

I. CRT / RECORDER GAIN, Select LEAD II and set ecg simulator for a 1 MV output (on lead II configuration). Adjust ECG SIZE for a X 2.0 display on CRT. press the RECORD pushbutton. Verify that the signal amplitude on the crt is 3.4 CM +/- .2 CM (may
be lower if mon. Mode is selected). Verify that the signal amplitude recorded on the ecg paper is 2.0 CM +/- .1 CM. (PHYSIO SPEC.)

J. HEART RATE ACCURACY, Adjust ECG SIZE for a X 1.0 display on CRT. Set the ecg simulator @ 30, 60 & 240-250 bpm. Verify that the systole indicator flashes with each ecg waveform and that the displayed HR is within +/- 3 BPM @ 30 & 60 and within +/- 7 BPM @ 240-250. (PHYSIO SPEC.)

K. RATE ALARMS / ALARM - ACTIVATED RECORDINGS, With ecg simulator set @ 240-250 BPM, press the HR ALARM pushbutton once. Verify that the HR ALARM LED is ON and 150/40 is disabled in REVERSE VIDEO. Press the HR ALARM pushbutton and verify that 120/60 and 160/90 are displayed consecutively. Select 150/40. Verify that after about 2 sec. 150/40 is displayed in NORMAL VIDEO. The alarm should then sound, the 150 flashes, and the recorder should start running. Press the HR ALARM pushbutton and verify that the alarm stops. Decrease the ecg simulator rate to 30 bpm. Press the HR ALARM pushbutton. Verify that the alarm sounds, the 40 FLASHES, and the recorder runs. Press the HR ALARM pushbutton to stop alarm.

L. RECORDER ANNOTATION, Verify that the recorder has annotated the HEART RATE, TIME, and DATE about every 20 SEC. during alarm conditions. Verify the time is accurate. Change the lead setting to LEAD III. Verify the recorder annotates the NEW LEAD SETTING along with the HEART RATE, TIME, and DATE.

M. CRT INTENSITY, Insure that in a well-lit room, at a distance of 5ft. from the instrument, the trace should be clearly visible.

N. DEFIB DISARM, press the ENERGY SELECT pushbutton and select 0 JOULES. Press the CHARGE pushbutton. Verify the CHARGE LED does not light and that the CRT continues to display 0 JOULES SELECTED.

O. CHARGE TIME (AC & BATTERY OPERATION) / OPEN AIR DISCHARGE, Press the ENERGY SELECT pushbutton and select 360 JOULES. Place the paddles in the paddle storage area of the instrument. Simultaneously press the CHARGE pushbutton and START the stopwatch. Stop the watch when the instrument reaches full charge. Verify the charge time is less than 10 sec. Press the paddle DISCHARGE pushbuttons to transfer the energy into the test load. Verify that the TEST USE 200 JOULES is displayed on the CRT. Remove ac power cord from source and repeat.
NOTE: SHOCK HAZARD - PROCEED WITH CAUTION

1. Select 360 JOULES and press CHARGE. Separate the paddles AT LEAST 1FT in the open air.
2. Shake the paddles and verify no discharge occurs.
3. Press the APEX DISCHARGE pushbutton and verify no discharge occurs.
4. Press the STERNUM DISCHARGE pushbutton and verify no discharge occurs.
5. Simultaneously press BOTH DISCHARGE pushbuttons and verify discharge occurs and the instrument continues normal operation.
6. Reconnect ac power cord to ac source.

P. ENERGY DUMP / SAFETY DUMP, Place the PADDLES in the paddle storage area of the instrument and set to 360 joules. Press the CHARGE pushbutton then change the energy level to 300 JOULES. Verify CHARGE REMOVED appears for 4-6 seconds and an alarm sounds. Press the ENERGY SELECT pushbutton and select 360 JOULES. Press the CHARGE pushbutton. When full charge is reached, immediately change the ENERGY LEVEL to 1 JOULE and press CHARGE. Verify full charge is reached in <23 seconds. (PHYSIO SPEC.)

Q. DELIVERED ENERGY, Connect paddles to defib analyzer and verify that the delivered energy is within the following PHYSIO CONT. specs.

<table>
<thead>
<tr>
<th>ENERGY SETTING</th>
<th>TOLERANCE</th>
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<tbody>
<tr>
<td>5 JOULES</td>
<td>+/- .5 &quot;</td>
</tr>
<tr>
<td>9 &quot;</td>
<td>+/- .9 &quot;</td>
</tr>
<tr>
<td>10 &quot;</td>
<td>+/- 1.0 &quot;</td>
</tr>
<tr>
<td>100 &quot;</td>
<td>+/- 10 &quot;</td>
</tr>
<tr>
<td>360 &quot;</td>
<td>+/- 36 &quot;</td>
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IF OUT OF SPECIFICATION SEE SERVICE MANUAL FOR CAL.

R. SYNC / SYNC ANNOTATION, Press the LEAD SELECT pushbutton until PADDLES is selected. Press the SYNC pushbutton and verify that FOR SYNC: USE LEADS legend flashes five times on CRT and three warning tones sound. Press the LEAD SELECT pushbutton until LEAD II is selected. Set the ECG simulator rate to 60 bpm. Verify that the warning message is not displayed and the tone in not present when this is performed. Press SYNC. verify SYNC MODE legend is displayed on CRT, the sync marker is clearly visible on each displayed R-wave, and the SYNC LED flashes. Press the RECORD pushbutton. Verify
that the annotated data includes *SYNC* and a sync marker is clearly visible on the recorded ECG trace. Place paddles in the paddle storage are of the instrument. Press the **ENERGY SELECT** pushbutton and select **200 JOULES**. press the **CHARGE** pushbutton. Wait until the instrument reaches full charge. Simultaneously press **BOTH PADDLE DISCHARGE** pushbuttons. Verify that recorder annotates **SYNC TEST 200 JOULES DELIVERED**.

S. SYNC DELAY / CODE SUMMARY, Turn the instrument power **OFF** then **ON** again. Connect ECG leads to defib. Analyzer & select **CARDIOVERSION** or **SYNC** mode on analyzer. Select the **300 JOULE SCALE** on analyzer or **1000 JOULES** on the QED.6(BIO TEK). Place the paddles on the defib. Analyzer paddle plates. Press the **SYNC** pushbutton on instrument. Select **200 JOULES** and press the **CHARGE** pushbutton. When full charge is reached, simultaneously press **BOTH PADDLE DISCHARGE** pushbuttons to transfer energy into the analyzer. Verify that the analyzer indicates proper output and that the cardioversion **PASS LED** is lit or on the QED.6 the **SYNC PEAK DELAY** is <60 mS (BIO TEK SPEC)..<br>Optional: delay of delivered energy should be <30 ms. (AAMI SPEC.) press the **CODE SUMMARY** pushbutton. Verify that the recorded data **CODE SUMMARY** list the following information.<br>
**DATE**, **ELAPSED TIME**, **POWER ON TIME**, **TOTAL SHOCKS**, **PRESHOCK WAVE**, **POSTSHOCK WAVE** and **ECG DATA**.