



# QA-45

## MKII Defibrillator-/ Transcutaneous Pacemaker Analyzer

### PRODUCT HIGHLIGHTS

- Biphasic energy measurement
- Energy and cardioversion measurement
- Peak voltage and current reading
- Storage and playback of output waveform
- 12 lead ECG simulation
- ECG, Performance and Arrhythmia simulation
- Automatic defibrillator test procedures
- Pacemaker loads from 50 ohm to 2300 ohm
- Accuracy Tests; Amplitude, Rate, Pulse width
- Demand Sensitivity Tests; Amplitude, Rate, Pulse width, Square, Triangle, Haversine
- Sensed Refractory Period
- Paced Refractory Period
- 60/50 Hz Immunity Test
- Pulse Energy
- Large graphic display
- RS-232C and Centronic printer interface
- Battery operation or AC adapter

### OVERVIEW

The QA-45 MKII Defibrillator-/ Transcutaneous Pacemaker Analyzer is a precision instrument for testing defibrillators and external (transcutaneous) pacemakers. The build-in test procedures and extensive resistance loads for pacer testing, make the QA-45 a versatile test instrument and solid value.

The test result can either be written directly to a printer from the QA-45, or they may be transferred to *ansur* QA-40/45 test automation software. With *ansur*, you can make your own test protocols, store protocols and test results to disk, and provide test data to update your equipment management database.

# QA-45 MKII Specifications

## DEFIBRILLATOR ANALYZER

### ENERGY OUTPUT MEASUREMENT:

#### HIGH RANGE:

Voltage: < 5000 V  
Maximum current: 120 A  
Maximum Energy: 1000 J  
Accuracy:  $\pm 2\%$  of reading for > 100 J  
 $\pm 2\%$  of reading for < 100 J  
Trigger level: 100 volts  
Playback amplitude: 1 mV/1000 V Lead I  
Test pulse: 125 J  $\pm 20\%$

#### LOW RANGE:

Voltage: < 1000 V  
Maximum current: 24 A  
Maximum Energy: 50 J  
Accuracy:  $\pm 2\%$  of reading for > 20 J  
 $\pm 2\%$  of reading for < 20 J  
Trigger level: 20 volts  
Playback amplitude: 1 mV/200 V Lead I  
Test pulse: 5 J  $\pm 20\%$   
Load resistance: 50 ohms  $\pm 1\%$ ;  
non-inductive (< 1  $\mu$ H)  
Display resolution: 0.1 J  
Measurement time Window: 100 ms  
Absolute max. peak Voltage: 6000 V  
Pulse width: 100 ms  
Cardioversion: Measured time delay  $\pm 2$  ms  
Biphasic Measurement

### OSCILLOSCOPE OUTPUT:

High Range: 1000:1 amplitude attenuation  
Low Range: 200:1 amplitude attenuation

### WAVEFORM STORAGE AND PLAYBACK:

Discharge can be viewed via ECG outputs and paddles  
Output: 200:1 Time Base Expansion

### SYNC TIME MEASUREMENTS:

Timing window: Starts 40 ms before each R wave peak  
Test waveforms: All Waveform simulations available  
Delay time accuracy:  $\pm 1$  ms

### CHARGE TIME MEASUREMENT:

From 0.1 to second to 99.9 seconds

## ECG WAVE

### ECG GENERAL:

Lead configuration: 12-lead simulation.  
RL, RA, LA, LL, V1-6  
Output Impedance:  
Limb leads: 1000 ohms to RL  
V Leads: 1000 ohms to RL  
High level Output: 1.0 V/mV of low level (lead II)

### MANUAL ECG PERFORMANCE TEST:

DC Pulse: 4.0 seconds 1.0 mV  
Square wave: 2 Hz 1.0 mV p-p  
Triangle wave: 2 Hz 1.0 mV  
Sine waves: 0.1, 0.2, 0.5, 10, 40, 50, 60, 100Hz  
Amplitudes: 0.5, 1.0, 1.5, 2.0 mV (Lead II)  
Accuracy:  $\pm 5\%$  (Lead II 1.0 mV)

### ECG PERFORMANCE TEST:

Gain/Damping: 2 Hz square wave  
Frequency response:  
Low Frequency: 4 second DC pulse  
Band Pass: 10 Hz sine  
Monitor: -3dB point: 40 Hz sine  
Power line notch filter: 50 Hz sine  
Linearity: 2 Hz triangle wave

### NORMAL SINUS:

Rates: 30, 60, 80, 120, 180, 240 & 300 BPM  
Accuracy:  $\pm 1\%$  of selection  
Amplitudes: 0.5, 1.0, 1.5, 2.0 mV (Lead II)  
Accuracy:  $\pm 5\%$  (Lead II 1.0 mV)  
Automatic ECG rate Test

### ARRHYTHMIA SELECTIONS:

vfb - Ventricular Fibrillation  
afib - Atrial Fibrillation  
blk II - Second degree A-V block  
RBBB - Right Bundle Branch Block  
PAC - Premature Atrial Contraction

PVC\_E - Early PVC  
PVC\_STD - PVC  
PVCRonT - R on T PVC  
mfPVC - Multifocal PVC  
bigeminy - Bigeminy  
run5PVC - Run of 5 PVCs  
vtach - Ventricular Tachycardia

### SHOCK ADVISORY ALGORITHM TEST:

8 ECG signals are available to test the advisory algorithm of Automatic defibrillators:

- Asystole
- CVF: Coarse Ventricular Fibrillation
- VVF: Fine Ventricular Fibrillation
- MVT 140: Multifocal Ventricular Tachycardia @ 140 BPM
- MVT 160: Multifocal Ventricular Tachycardia @ 160 BPM
- PVT 140: Polyfocal Ventricular Tachycardia @ 140 BPM
- PVT 160: Polyfocal Ventricular Tachycardia @ 160 BPM
- SVTa 90: Supra Ventricular Tachycardia @ 90 BPM

## TRANSCUTANEOUS PACEMAKER ANALYZER

### TEST LOAD RANGE:

50 to 2300 ohms in step of:  
- 50 ohm up to 200 ohms  
- 100 ohm from 200 up to 2300 ohms  
Accuracy: 50 - 1300 ohm  $\pm 1\%$   
1400 - 2300 ohm  $\pm 1.5\%$

### OSCILLOSCOPE OUTPUT:

50 - 150 ohm 10.24:1 amplitude attenuation  
200 - 500 ohm 41:1 amplitude attenuation  
600 - 2300 ohm 164:1 amplitude attenuation

### PULSE MEASUREMENTS:

**Amplitude:** 4 to 300 mA (100 ohm load)  
**Accuracy:**  $\pm 5\%$  or  $\pm 0.5$  mA  
**Max. amplitude:** 300 mA all loads  
**Rate:** 30 to 800 ppm  
**Accuracy:**  $\pm 1\%$  or 2 ppm  
**Pulse Width:** 0.6 to 80 ms  
**Accuracy:**  $\pm 1\%$  or  $\pm 0.3$  ms

### DEMAND SENSITIVITY TEST:

Waveforms: Square (SQR),  
Triangle (TRI)  
and Haversine (SSQ)

### ECG OUTPUT:

**Amplitude:** 0 - 4 mV  
**Resolution:** 40  $\mu$ V

### PACER INPUT (Load depended):

**Amplitude (50 ohm):** 0 - 10 mV  
**Resolution (50 ohm):** 40  $\mu$ V

**Amplitude: ( $\geq 500$  ohm):** 0 - 100 mV  
**Resolution: ( $\geq 500$  ohm):** 1 mV

### DEFIB. PADS:

**Amplitude:** 0 - 10 mV  
**Resolution:** 0.1 mV

Waveform width: 10, 25, 40, 100 and 200 ms

Pacer rate: 30 to 120 ppm

### IMMUNITY TEST:

50/60 Hz Interference Signal:

### ECG OUTPUT:

0 - 4 mV peak in step of 0.4 mV

### PACER INPUT (Load depended):

0 - 10 mV peak in step of 1 mV (50 ohm)  
0 - 100 mV peak in step of 10 mV ( $\geq 500$  ohm)

### DEFIB. PADS:

0 - 10 mV peak in step of 1 mV

### REFRACTORY PERIOD MEASUREMENT:

20 to 500 ms (both Pacing and Sensing)  
Accuracy:  $\pm 2$  ms

## ansur QA-40/45 OFFERS THE FOLLOWING FEATURES

ansur QA-40/45 is a 'remote control' program developed to control QA-45 from a PC. The following section describes ansur QA-40/45, and how it works. ansur QA-40/45 is supplied with its own user manual, which contains all information about the product. This manual is also supplied when ordering the demonstration version of the program. ansur QA-40/45 is run as a Microsoft Windows application.

ansur QA-40/45 offers the following functions:

- Manual energy test
- Automatic energy test
- ECG simulation
- ECG performance test
- Manual pacer, sensitivity and refractory period test
- Automatic pacer test sequence
- Test protocols for each individual instrument

## GENERAL INFORMATION

**TEMPERATURE RANGE:** +15°C to +35°C operating;  
0°C to +50°C storage.

### DISPLAY:

Type: LCD graphic display.  
Alphanumeric format: 8 lines by 40 characters.

### DATA INPUT/OUTPUTS (2):

Parallel printer port (1); bi-directional  
RS-232C (1) for Computer control.

**POWER:** 2 x 9 Volt Alkaline Battery or  
240 VAC Battery Eliminator.  
115 VAC Batt. el. for US.

**HOUSING:** High impact plastic case.

**DIMENSIONS:** D x W x H:  
28.0 cm x 24.8 cm x 9.8 cm

**WEIGHT:** 2.06 kg with battery.

### STANDARD ACCESSORIES:

User/Service manual  
Battery Eliminator  
9 Volt Alkaline Battery

### RECOMMENDED PRINTERS:

HP Desk Jet, Canon Bubble Jet or compatible

## QA-45 MKII ORDERING INFORMATION

### Order no:

**13030:** QA-45 MKII Defibrillator-/  
Transcutaneous Pacemaker Analyzer

### Accessories:

**17021:** Battery Eliminator 240 VAC  
**17027:** Battery Eliminator 115 VAC  
**13422:** Carrying Case  
**10500:** Carrying Case, ext. printer  
**13403:** Internal paddle contact adapter  
**13404:** Ground contact adapter  
**13410:** Defib./Pace Test Cable, Laerdal  
**13411:** Defib./Pace Test Cable, Physiocontrol  
**13412:** Defib./Pace Test Cable, Marquette  
**13415:** Defib./Pace Test Cable, HP/Agilent  
**13416:** Defib./Pace Test Cable, S&W Arterna  
**13417:** FR2 Paddle Contact Adapter, HP/Agilent  
**13427:** Defib./Pace Test Cable, Zoll  
**13428:** Pace Only Test Cable, Physiocontrol  
**13429:** Pace Only Test Cable, Zoll  
**17024:** Universal Banana Adapter  
**13600:** ansur QA-40/45 Plug-In  
**13601:** ansur QA-40/45 Plug-In, demo  
**13605:** User manual ansur QA-40/45 Plug-In  
**13060:** User/Service manual QA-45