

PHILIPS

patient monitoring
the modular system

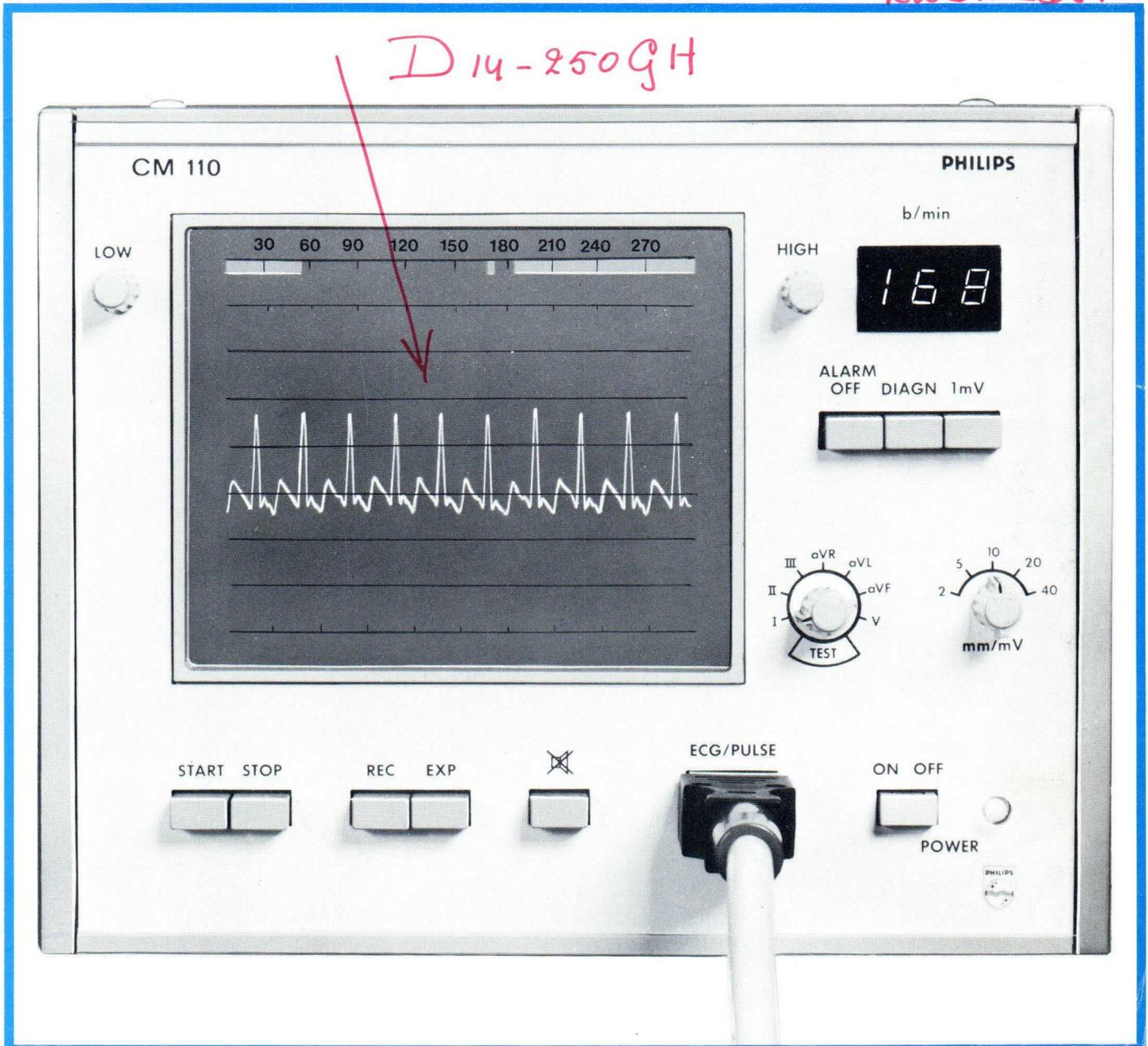
CM 110
cardiac monitor

9822 152 70001

Retour: Sieben a.g.

Kwal. Lab.

D14-250gH



**Medical
Systems**

Features

Non-fade ECG or pulse wave display

Full ECG lead selection

Diagnostic and monitoring bandwidths

ECG or pulse wave, heart rate and
alarm limit display on one screen

Separate numerical rate indicator

Remote recorder start

Fully defibrillator proof

No burnt skin effects with pulse
pick ups

No light interference on pulse
wave signal

Low power consumption

Description

The CM 110 is a self-contained mains powered unit, 3/6 of 19 in. wide and 4E high. It includes a cardioscope, an ECG amplifier and a peripheral pulse amplifier, so that either an ECG, or a pulse wave can be displayed. The heart rate is presented on the scope in combination with the upper and lower alarm limits set.

These are presented as horizontal bars at both sides of the vertical rate indicator line. In this way, the position of the rate indicator line between the alarm limit bars is clearly shown. This is a feature which has been found in the Philips patient monitoring programme for many years. The clear numerical display gives information on the heart rate for views from longer distances and at low ambient light levels.

The display mode can be selected using either a moving bar or running trace. The normal time base speed is 25 mm/s. It is, however, possible to double this speed. This can also be done when the trace has been stopped manually. When stopping a trace which is presented in the moving bar mode, it is 'regrouped' so that the newest information is displayed at the extreme right of the screen and the oldest information at the left.

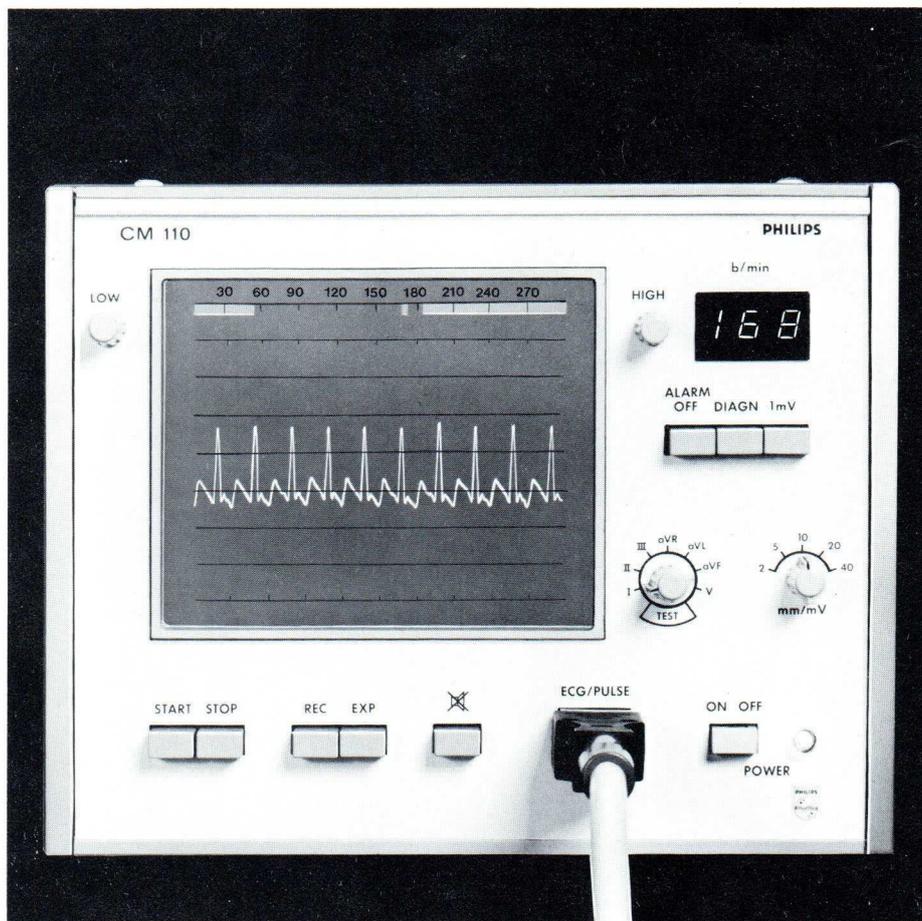
The isolated ECG amplifier (type CF) has its input at the front of the apparatus.

The CM 110 is provided with an ECG selector for I, II, III, aVR, aVL, aVF, V and test.

Amplification is done in fixed steps of 2, 5, 10, 20 and 40 mm/mV.

The 1 mV calibration device gives a calibration pulse on the trace while the ECG is temporarily suppressed. As long as the button is kept depressed, the pulses are repeated and the amplifier is stabilized.

The amplifier has two bandwidths; the diagnostic bandwidth for showing the fine details in the ECG, and the monitoring bandwidth for stable zero line and a maximum 50/60 Hz interference suppression.



Pacemaker pulses are clearly visible on the cardioscope. In most circumstances they are not counted by the rate counting circuitry. The amplifier is fully defibrillator-proof. Even when defibrillation is done with the electrodes in contact with the ECG electrodes, the apparatus will not be damaged.

When combined with the isolated Philips ear pulse and finger pulse pick-ups, the amplifier is of the CF type. The amplifier uses the same input socket on the front panel as the ECG amplifier.

When an ECG cable is replaced by a pulse pick-up, the pulse wave is automatically shown on the cardioscope instead of the ECG. The heart rate is then calculated from the pulse wave instead of from the ECG.

Burnt skin effects are almost entirely eliminated due to the use of a gallium-arsenide diode as the light source. Another feature is that fluorescent or other light sources no longer interfere with the pulse wave.

The heart rate counter is of the self-adjusting discriminator type, so that no manual sensitivity adjustment is required.

There is also no special control required for the counting of positive and negative waves.

The minimum amplitude of the input signal in order to assure a reliable count should be such that the size of the signal on the scope is between a 1 and 7 cm peak.

The linear heart rate scale is from 0 - 300 b/min. On the cardioscope, the value rate displayed is continuously adapted to the newest information. The separate LED display, however, shows the newest information every 2 seconds in order to obtain a stable display.

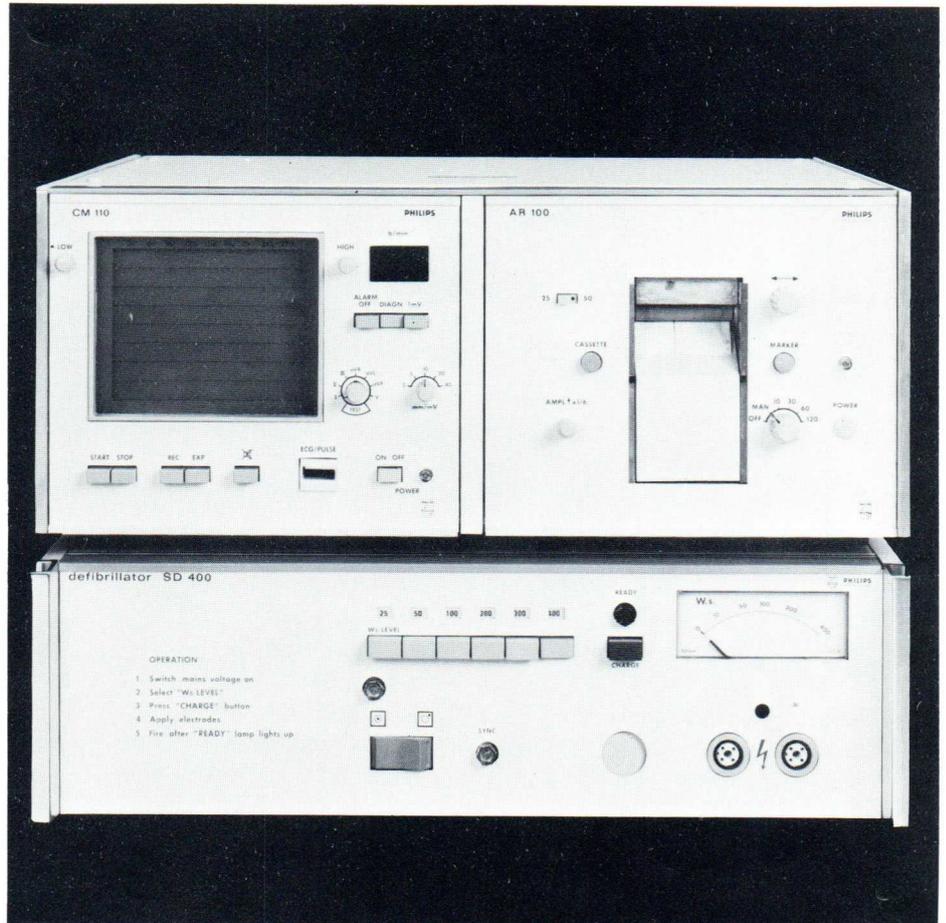
It is possible to make the heart rate audible with the incorporated beeper. 'Beep' on and off is controlled by a pushbutton on the front panel.

Upper and lower alarm limits can be set. They are presented as horizontal bars in the top centimetre of the cardiophone screen. When the small heart rate indication line enters a bar, it makes this bar start flickering, thus indicating an alarm state. The incorporated beeper gives an audible alarm after a certain delay time. The alarm signal can be used for starting bedside or remote recorders and for remote alarm indication e.g. in a central station. The alarm system can also be switched off. Both alarms bars start flickering to indicate this.

A bedside or remote alarm recorder can be started manually by a push-button on the front panel. The recorder can be connected to the CM 110 in such a way that it may record the non-delayed or the delayed ECG signal.

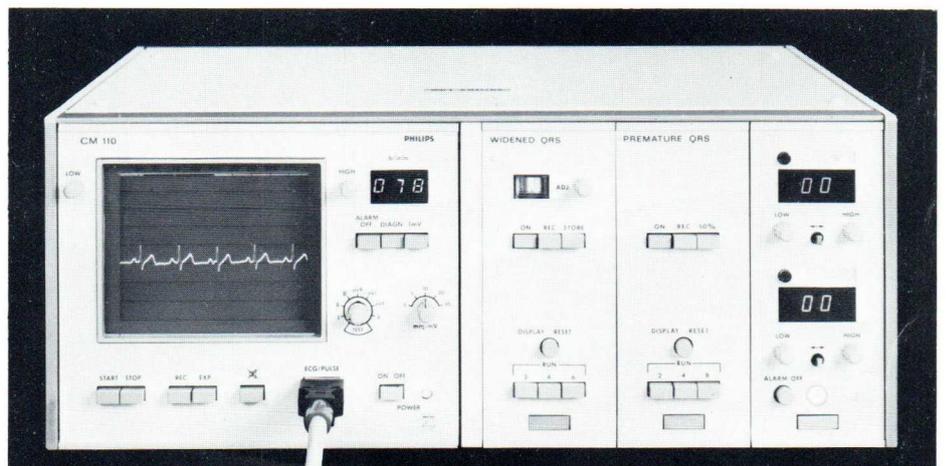
Facilities are provided for connecting arrhythmia modules of the Philips modular patient monitoring system, these are mainly for use in the CCU. It is also possible to connect the EEG pre-amplifier 9822 151 80001. The unit is simply plugged into the ECG/pulse cable input socket at the front.

Lastly, the CM 110 can operate as the monitor of a cardiac resuscitation unit. It supplies the synchronisation signal to the Philips defibrillators.



▲ Heart resuscitation unit consisting of defibrillator SD 400, cardiac monitor CM 110 and recorder AR 100.

▼ CM 110 combined with arrhythmia detection modules.



Specification

Tube dimensions: useful area 8x10 cm

Filter: grey with horizontal heart rate scale; horizontal cm division grid with vertical 1 cm division indications

Number of channels: one for heart rate indication and one for the physiological signal

Time base: 25 mm/s and 50 mm/s

Time window: 4 and 2 s depending on the selected time base

Freeze facility: available

Display mode: non-fading; running trace and moving bar mode selectable at the rear

Number of bits: 8 for 7 cm

Sample rate: approx. 250 samples/s

Physiological signals: ECG, peripheral pulse or external signal. Connection for ECG and pulse via the same input socket

ECG leads: I, II, III, aVR, aVL, aVF, V, and test

ECG bandwidths:
diagnostic 0.05 - \geq 100 Hz (-3 dB)
monitoring 0.3 - \geq 25 Hz (-3 dB)

1 mV calibration: 100 ms pulse, repeating with 100 pulses per minute

Stabilisation: by keeping 1 mV knob depressed; automatically when mean signal amplitude is 4 cm on scope; stabilisation time 0.5 s

ECG amplification: 2, 5, 10, 20 and 40 mm/mV ($\pm 5\%$)

ECG input: Common mode AC interference is reduced by a factor of 160,000 at 50/60 Hz with 5 Kohm imbalance (measured on ECG electrodes) Impedance patient circuit to chassis for 50 Hz 400 M ohm
Max. current 0.04 μ A/V

ECG output: for recorder an amplification factor of 200 in position 10 mm/mV
Bandwidth: dependent on monitoring or diagnostic mode selection
Max. undistorted output signal + and -1.5 V
Output impedance ≤ 10 ohm
Signal with fixed amplification factor of approx. 1200 (300 times in position 2 mm/mV)
Max. undistorted signal + and -7 V
Output impedance ≤ 10 ohm

Defibrillator shock: no damage with 300 Ws on electrodes over 50 ohm (max. 4000 V)

DC offset: 300 mV between two electrodes, and 400 mV between all electrodes and reference electrode, do not influence specification of unit

Bandwidth: 0.3 - ≥ 25 Hz (-3 dB)

Ambient light interference: none; minimal heat generation in pick-ups so that blister formation is avoided

External signal: sensitivity 200 mV/cm; input impedance 10 k ohm

Delayed signal output: 4 s or 2 s depending on selected time base
Bandwidth 0 - 60 Hz (-3 dB)
Output impedance ≤ 10 ohm
Relation input/output signal 1 : 1
Max. undistorted output signal + 850 and -650 mV

Heart rate presentation: by vertical line, length 5 mm; by LED's, 3 digits, height 7 mm

Heart rate scale: horizontal scale on scope; linear, 0 - 300 b/min; length 10 cm

Parameters: ECG and peripheral pulse

Dead time between counts: 140 ms

RC-time: 5 s

Sensitivity for counter: signal amplitude on scope has to be 1 - 7 cm peak

Defibrillator synchronization pulse: 0 - 10 V (± 0.5 V), duration 10 ms (± 1 ms)

Beeper: on each count; can be switched off. Volume can be controlled at the rear

Heart rate output:
0 - 200 b/min 0 - 1 V
0 - 300 b/min 0 - 1 V
Inaccuracy at rate of ≥ 30 b/min less than 2% of rate value

Inaccuracy of numerical rate indicator: less than 2 b/min or 3% of rate value

Pacemaker pulses: not counted in most circumstances

Alarm limits: visualized by horizontal bars on scope; width approx. 5 mm

Alarm limit ranges: 0 - 300 b/min for both limits; lower range can be set below zero

Alarm indication: by flickering bar(s)

Alarm modes: general (multi) alarm, switching (single) alarm and alarm indicating voltages

General (multi) alarm: extra floating alarm contacts; switching power 24 V/100 mA
Alarm delay time 2 - 16 s. With memory function

Audible alarm: available; volume adjustable at rear

Alarm reset: by pushbutton; bars start flickering

Recorder start: pushbutton for remote recorder start

Mains: 110, 120, 220, and 240 V, 50/60 Hz

Permissible mains fluctuations: + and -10%

Specification

continued

Safety class according to IEC 62A

WG1 (secr. 10): I, type CF, when combined with Philips isolated pulse pick-ups 9822 806 00101 and 9822 806 50101

Leakage current: patient leakage current 0.5 μ A

Dimensions:

Height: 177 mm (4E)

Width: 3/6 of 19 in.

Depth: 400 mm

Weight: 8.5 kg

Colour: white front panel, light grey knobs; green cardioscope display, red numerical heart rate display

Type number: 9822 152 70001

Accessories

Mains cable, 3-core, length 2.5 m

Spare fuses for 110 and 220 V

Cap for covering hole in front panel when the ECG lead selector is removed

Optionals

9822 807 20009 ECG cable, 3-core

9822 807 30009 ECG cable, 5-core

9822 800 02009 25 sets of 3 disposable ECG monitoring electrodes

9822 800 02109 25 sets of 3 disposable ECG monitoring electrodes for children

9822 806 90009 Set of 24 non-disposable ECG electrodes

9822 807 00009 Role of 1500 adhesive discs for 9822 806 90009

9822 801 70009 6 tubes of electrode jelly for refill purposes

9822 806 00101 Ear pulse pick-up

9822 906 50101 Finger pulse pick-up

9822 806 30001 HF protection set

9822 806 60001 Cable for connection to a main frame 9813 853 01001

9822 805 10001 Cable for connecting CM 110 to a wall junction box
9822 950 61 01

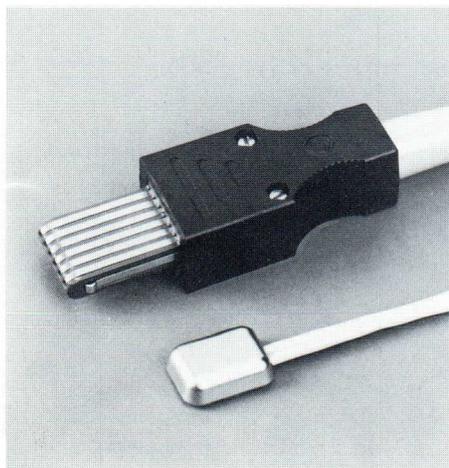
9822 951 00009 Wall bracket

9822 951 20001 Rear cover

9813 853 20001 Top, bottom and side panels for a 3/6 of 19-in wide unit

9813 853 30001 Top, bottom and side panels for two coupled 3/6 of 19-in wide units

▼ *Finger pulse pick-up*



▼ *Ear pulse pick-up*

