

COMPARISON OF ELECTROCARDIOGRAPHS “EK3T-01-P-D” AND “SCHILLER CARDIOVIT AT-4”

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Nowadays, electrocardiograph is a mandatory attribute of any cardiology clinic, ambulance crew and reanimation or surgical departments. The basic operating principle of the unit is to scan the electrical potentials of the heart muscle and record them in the form of an electrocardiogram.

Modern electrocardiographs have the following possibilities:

- determination of the frequency and heart rate;
- identification of the rhythm and conduction disturbances (blocking, arrhythmias as well as forecast for these diseases);
- localization of the focus and ways of tachyarrhythmia origin;
- diagnosis of the heart muscle disease (acute coronary syndrome, necrosis of paries or cicatrical changes after myocardial infarction);
- determination of the intensity of cardiac muscle ischemia;
- identification of cardiac muscle disease of infectious genesis (myocarditis), etc [1–5].

In our research we compared EK3T-01-P-D and CARDIOVIT AT-4 electrocardiographs.

Electrocardiograph EK3T-01-P-D is a medical device of domestic production. It is used to diagnose cardiac pathologies. It can be used both in hospitals, clinics and ambulances.

EK3T-01-P-D has a graphic LCD display and provides high quality results. This unit has a test mode. It helps compare ECG conducted at different times.

EK3T-01-P-D has the following advantages:

- efficiency of diagnostic testing;
- accurate results;
- long service life;
- ease of use;
- reliability.



Image 1. EK3T-01-P-D

Electrocardiographs		
Model	EK3T-01-P-D	SCHILLER CARDIOVIT AT-4
Number of channels	One–three channels	Three channels
Simultaneous recording	6–12 leads	12 leads
Printing rate, mm/sec	5, 10, 25 or 50 mm/sec	5/25/50 mm/sec
Display	Time and date	Time and date
Protection	Built-in protection from defibrillation	Built-in protection from defibrillation
Keyboard	Membrane keyboard with functional alphanumeric keys	Rubber keys and manipulator
Filters	anti drift	smoothing
	anti tremulous	muscle tremors 25 or 35 hz
	rejection	power supply
Sensitivity	2,5; 5; 10; 20 or 40 mm/mV with an accuracy of $\pm 5\%$	5; 10; 20 mm/mV
Frequency bandwidth	0,05–160 hz	0.05–150 hz
Control	Control of electrode breakage	Control of electrode breakage

Table 2. Functional characteristics of electrocardiographs.

All electrocardiographs have the same operating principle, but they are different in implementation and manufacturing.

The principle of voltage measurers is the main in the operation of a medical electrical cardiograph. The oscillation of the difference of potentials (occurring in the excitation of the heart muscle) is fixed by electrodes attached to the patient's body and transmitted directly to the input of the device. The movement of the band fixing the electrocardiogram is carried out at different rates and may range from 25 mm/sec to 100 mm/s. The most common rate is 50 mm/s.

Both electrocardiographs have their pros and cons. These units are similar in their parameters. The only difference is the screen size. The screen of EK3T-01-P-D is smaller and less informative, but it is manufactured in Russia. So it is easier to get constitutive elements.

References

1. Electrocardiographs of leading manufacturers <http://www.ecardiograf.ru/elektrokardiograf-schiller-cardiovit-4> (accessed 13 April, 2016).
2. ZAO "Farm-Invest" <http://www.farm-invest.ru/cat/funkczionalnaya-diagnostika/elektrokardiografy/funelektrokar01> (accessed 13 April, 2016).
3. Research and Production Enterprise «Monitor» <http://www.monitor-ltd.ru/elektrokardiograf-ek3t> (accessed 13 April, 2016).
4. Manual of Medical Equipment <http://www.8a.ru/print/26895.php> (accessed 13 April, 2016).
5. Blog of Medical Student <http://nedomedic.ru/princip-dejstviya-elektrokardiografov.html> (accessed 13 April, 2016).

ENERGY GENERATION OF THE VIBRATION OSCILLATIONS. ELECTROMAGNETIC GENERATORS

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Alternative sources of energy in the form of wind and water mills exist centuries (they are getting high-power). In recent years, a small but fast-paced development of the systems segment energy micro from the environment.