

Comparison of EPIC electrodes with Ag/AgCl for ECG measurement

Purpose

This application note compares the use of traditional Ag/AgCl wet electrodes with EPIC for ECG measurement.

Introduction

Unlike the Silver/Silver Chloride electrodes used in clinical settings, the EPIC sensor makes a high impedance contact to the skin. This allows accurate and convenient measurement of the electrocardiograph (EKG/ECG). No gel, paste or other preparation is required at the sensor-skin interface. The connection is not affected by changes in skin impedance brought on by perspiration.

Dry-contact heart rate sensors, often integrated into chest bands, provide reliable heart rate measurement though they do not provide the rich information of a full EKG/ECG. The EPIC provides this full EKG/ECG from a dry-contact sensor, revealing additional information that can be used to diagnose and monitor heart wellness.

Signal Processing Requirements

The only filtering used in the following examples was a simple 50 or 60 Hz notch and a digital band pass filter coded into the LabView front end. For these examples the lower 3dB point was set to 500mHz and the upper to around 30 Hz.

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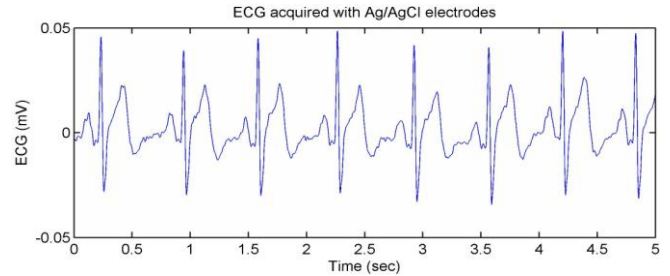
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Results

Fig(1.0) shows a lead One ECG trace obtained using a conventional wet electrode system (Ag-AgCl)



Fig(1.0) ECG using wet electrodes

This can be compared with a set of lead one measurements made using the EPIC electrodes Figures (2.0) Through (4.0).

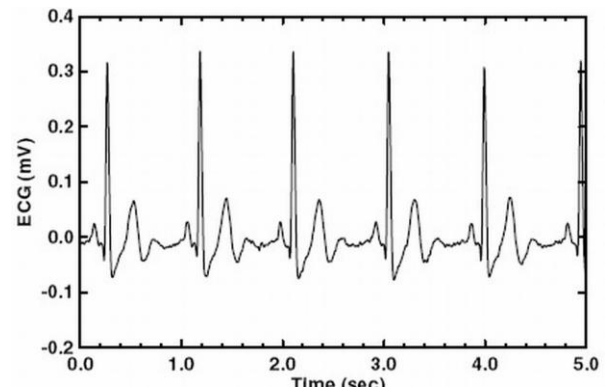


Fig (2.0) ECG trace from EPIC electrodes

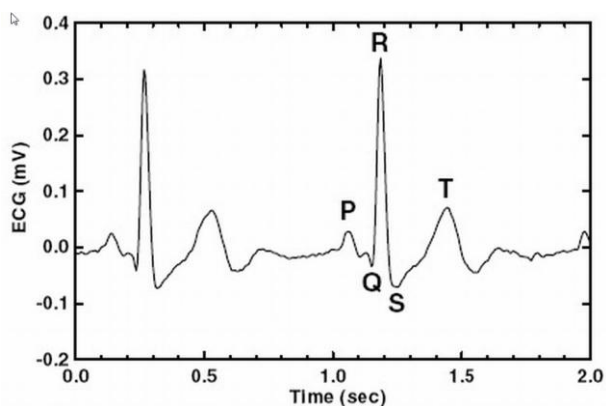
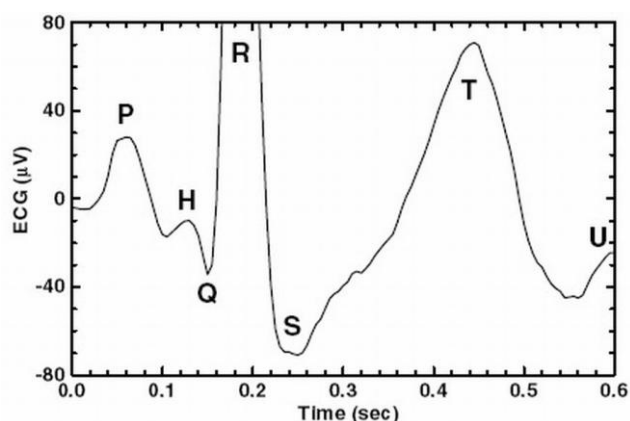


Fig (3.0) Identifiable components of EPIC ECG



Fig(4.0) The P-Q-R-S-T complex in more detail.

Conclusions

It can be seen that the EPIC sensor compares very favourably with traditional Ag/AgCl wet electrode technology. The high resolution data presented here are for a bandwidth of 0.5 to 30 Hz, this can be increased if necessary to meet clinical diagnostic ECG requirements.

Fig (3.0) shows the P-Q-R-S-T complex in more detail illustrating good resolution of the usual features.

Fig(4.0) is an example of an expanded trace that reveals some of the finer detail. Here we can see the H peak (His bundle de-polarisation) which is not usually observable with conventional electrodes.

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