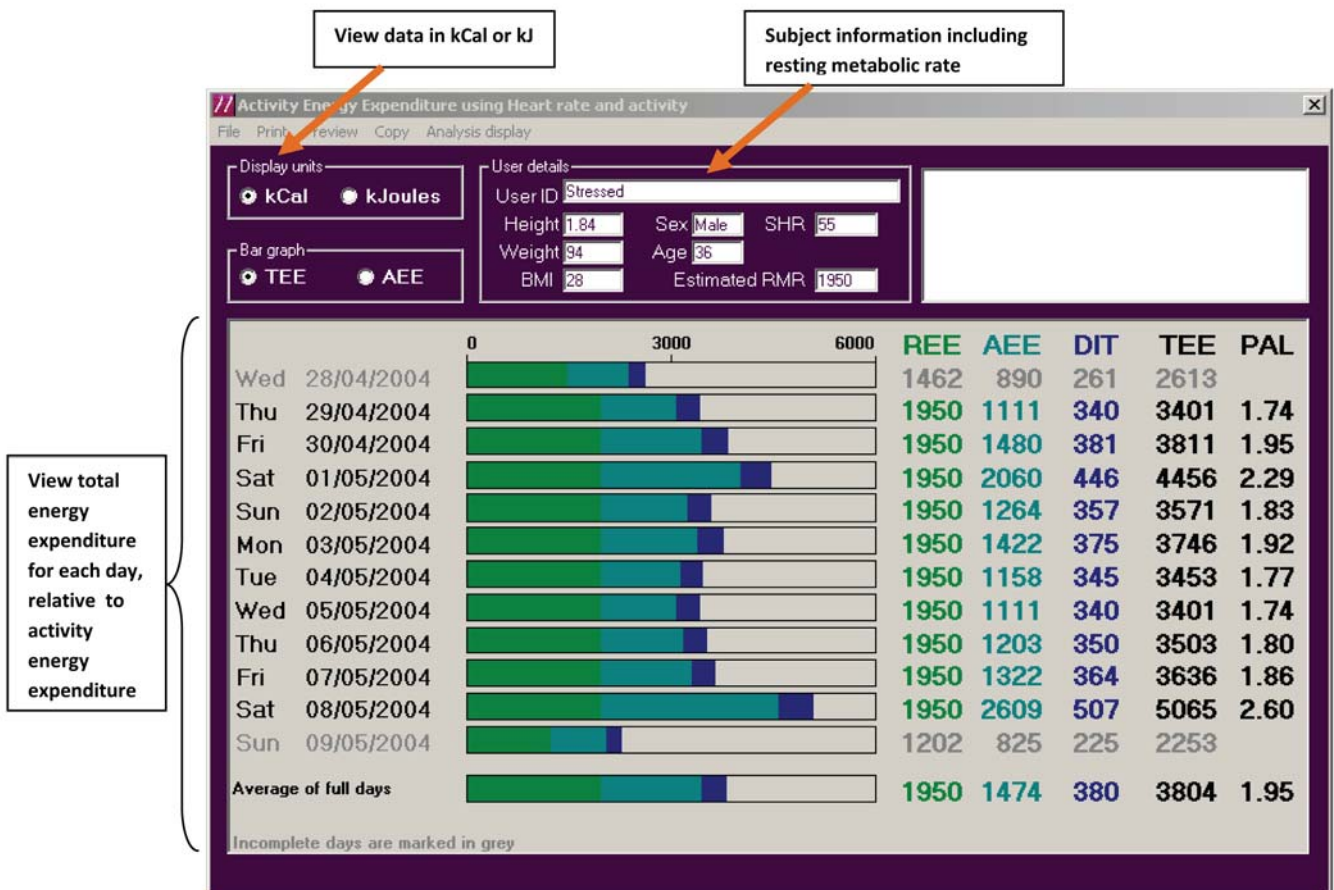


Activity Energy Expenditure and Daily Energy Expenditure are easily and accurately recorded with the Actiheart monitor. The Actiheart records the subject's heart rate and activity level simultaneously. This data is transferred to the Actiheart software which uses a validated branched-equation model^{1,2} to derive Activity Energy Expenditure for every epoch. The combination of heart rate and activity increases the accuracy of the Energy Expenditure calculation. Energy Expenditure calculations are within 0.02kJ/kg/min of those measured by a Cosmed K4b2³.

Example screenshot from Actiheart Software Activity Energy Expenditure Analysis window



Example screenshot from Actiheart Software Daily Energy Expenditure Analysis window



Key Terms:

REE – Resting Energy Expenditure (derived from Schofield Equations)

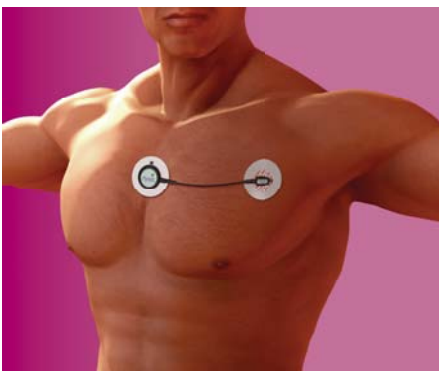
AEE – Activity Energy Expenditure (derived from branched model equations)

DIT – Dietary Induced Thermogenesis (estimated as 10% of TEE)

TEE – Total Energy Expenditure (REE + AEE + DIT)

PAL - Physical Activity Level (TEE/REE)

How does it work?



The Actiheart has two clips which attach directly to standard ECG electrodes. Usually one electrode is adhered at V1 or V2 (4th intercostals) and the second electrode is placed approximately 10cm away on the left side at V4 or V5, although this placement can be adjusted to be comfortable for the subject. The number of R-waves detected is recorded in 15, 30, or 60 second epochs. Simultaneously, an internal accelerometer senses the frequency and intensity of the subject's torso movements.

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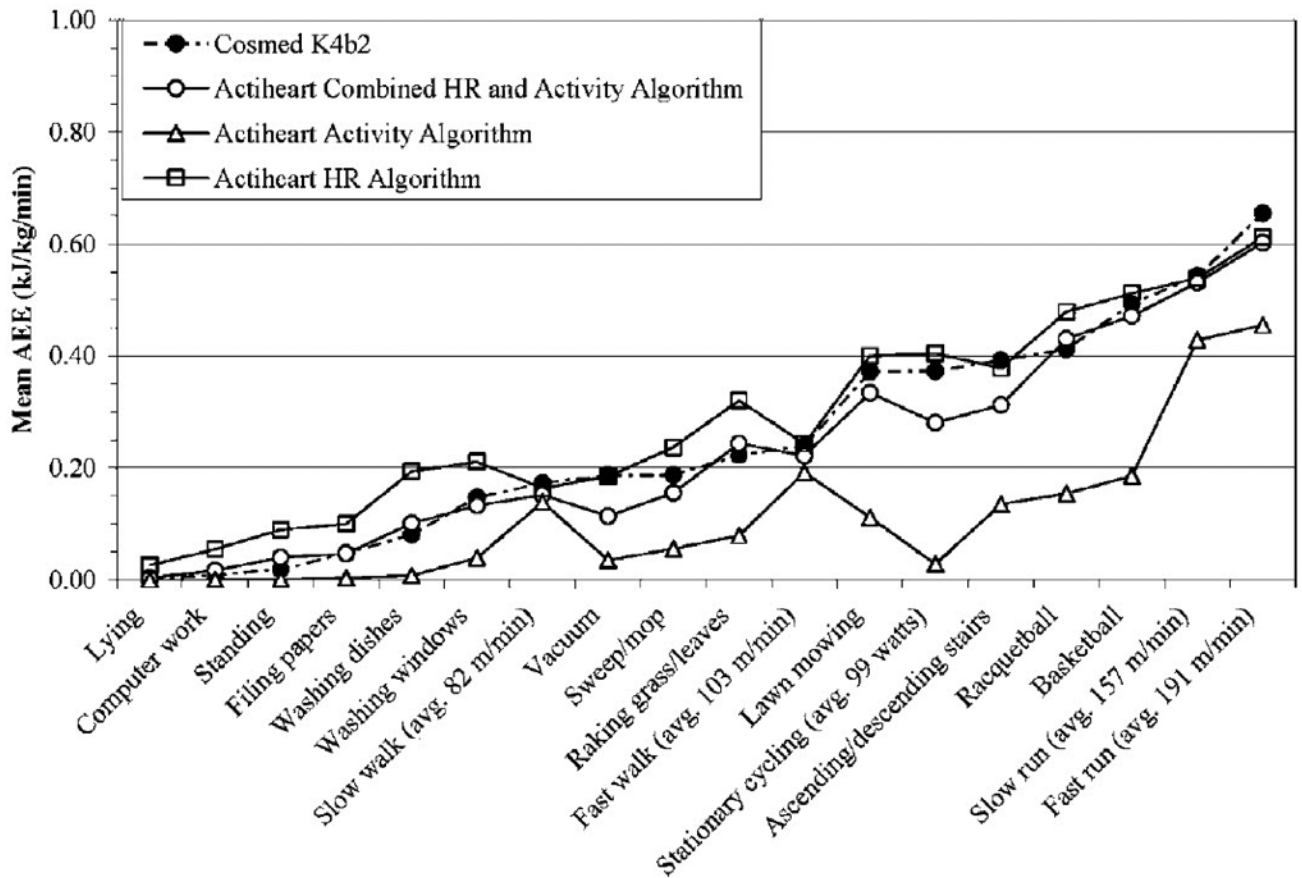
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The recorded heart rate and accelerometry data is then sent through a branched equation model. Each branched equation weights the activity and heart rate differently. Which branch is chosen is determined by the absolute activity and then by the relative heart rate level. By using the branched equation method, a high degree of accuracy for a wide range of activities can be achieved³.

Graph from **Crouter et al. European Journal of Clinical Nutrition (2008)**³ comparing the AEE accuracy of the Actiheart to the Cosmed K4b2. Note that the combination of heart rate and activity achieves more accurate energy expenditure results than energy expenditure calculated from activity alone for a wider variety of activities.



Actiheart advantages

- Extremely small, lightweight recording device. With a diameter of 32mm, thickness of 6mm and total weight of 10g, the Actiheart is ideal for ambulatory data collection. The Actiheart has been successfully used on infants, toddlers, children, athletic and non-athletic adults.
- Simultaneous collection of heart rate and accelerometry data gives better Energy Expenditure accuracy for a wider range of activities.
- Easy attachment using ECG electrodes keeps the Actiheart unobtrusive.
- Easy analysis of Activity Energy Expenditure or Daily Energy Expenditure.

Additional Information

See our website at www.camntech.com for more information regarding these products.

References

- 1 Brage, S., Brage, N., Franks, P., Ekelund, U., Wong, M., Anderson, L., Froberg, K. & Wareham, N. (2004) Branched equation modelling of simultaneous accelerometry and heart rate monitoring improves estimate of directly measured physical activity energy expenditure. *Journal of Applied Physiology*, 96: 343 – 351.
- 2 Brage, S., Brage, N., Franks, P., Ekelund, U., & Wareham, N. (2005) Reliability and validity of the combined heart rate and movement sensor Actiheart. *European Journal of Clinical Nutrition*, 59: 561–570.
- 3 Crouter, S., Churilla, J. & Bassett, D. (2008) Accuracy of the Actiheart for the assessment of energy expenditure in adults. *European Journal of Clinical Nutrition*, 62: 704–711.



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