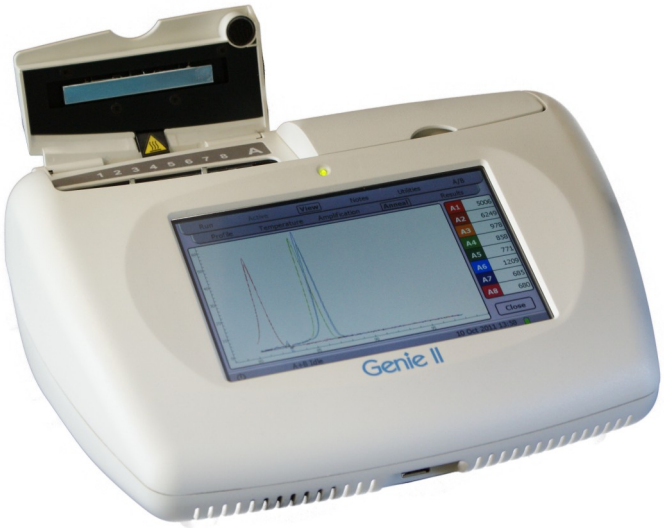
Genie® II

Molecular Diagnostics Made Simple

Genie® II is a sophisticated instrument that enables sensitive detection of bacteria and viruses at a molecular level. This powerful and extremely flexible platform allows isothermal amplification of DNA and RNA to take place in a compact and portable device. The instrument is supported by specially-designed tubes and highly efficient reagents to promote ease-of-use and ultra rapid detection capability, offering a complete solution to many nucleic acid detection requirements.



- Molecular detection of DNA or RNA by isothermal amplification in under 15 minutes
- Highly sensitive optics for detection of fluorescence and luminescence
- Two independent heating blocks incorporating precise control up to 99°C
- Compact, lightweight and fully portable with internal rechargeable battery
- Operation without a computer via a large touchscreen panel
- Operates with two specially-designed strips of 8 tubes, which can be used independently or together for a 16 sample run
- Software is simple to use and yet powerful in its analysis.
- Convenient ready to use reagents fully optimised for use on Genie® II
- Low price and cost of ownership

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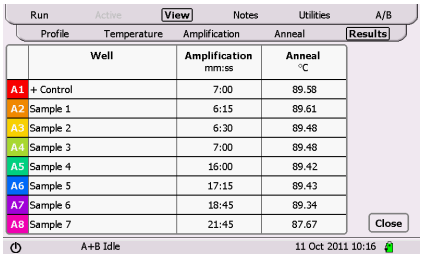
Genie® II allows molecular detection to be truly portable, sensitive and fast.

The Genie® II allows real-time isothermal amplification to be performed on a low power portable platform. The closed tube system used in Genie® II avoids any post-amplification handling thereby eliminating laboratory contamination from the amplified product.

Genie® II contains an internal rechargeable battery, allowing operation for a full day without the requirement for mains electricity.

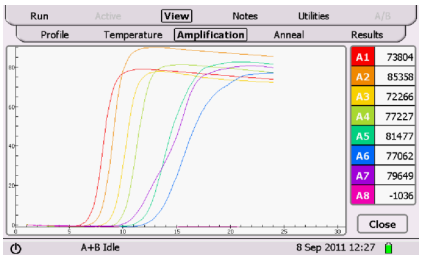
The Genie® II system includes two independent heating blocks, each taking an 8-microtube strip optimised for efficient thermal transfer. The instrument allows a temperature gradient to be established along each block for optimisation of the reaction temperature.



Results Table showing amplification time and anneal Ta

Software

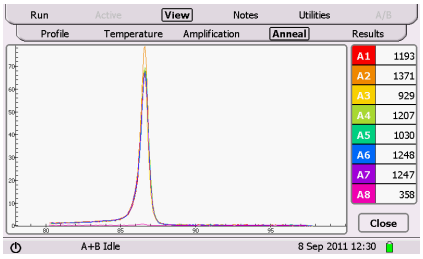
- Genie® II is controlled from a 7 inch touchscreen, no need for a computer
- The software is simple to use
- Fully automated interpretation of results
- PC software also included



Real-time isothermal amplification of a dilution series of a gene

Real Time monitoring

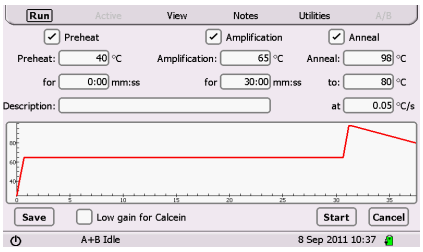
- Observe real-time data from isothermal amplification reactions
- Precision LED based optical detection system
- Monitor all dyes with excitation at 470nm and detection above 510nm



Real-time Anneal derivative of Isothermal amplified gene product

Annealing Curves

- Precise temperature control allows post amplification analysis of products
- Identify specific amplification



Isothermal Amplification run set up screen for the Genie® II

Optimisation

- Each block has multi-zone controlled heating allowing a gradient to be performed.
- Reactions can be optimised in minutes.
- Suitable for use with any isothermal amplification protocol

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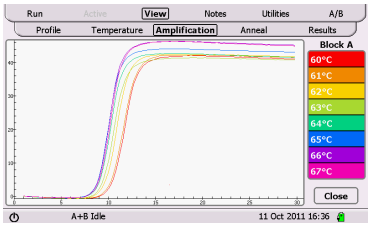
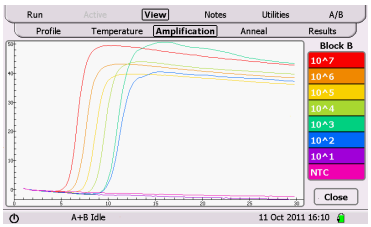
LAMP Isothermal Amplification

Using LAMP, a novel isothermal nucleic acid amplification technology developed by Eiken Chemical Co., Japan, together with the Genie® II instrument, a rapid test was produced for the detection of Shiga toxin-producing *E. coli* O104 (STEC O104:H4).

From the published genome sequence, LAMP primers were designed for two specific targets, *stx2* and the O104 antigen gene cluster, using the LAMP Designer software. Following optimisation of the reactions conditions, low copies were detected in <10 minutes using the Genie® II instrument and the ISO-001 Isothermal mastermix.



Temperature optimisation reaction conditions using the block temperature gradient feature of the Genie® II instrument.



Template dilution series of the optimised reaction for detection of the *stx2* gene from *E. coli* O104 (STEC O104:H4).

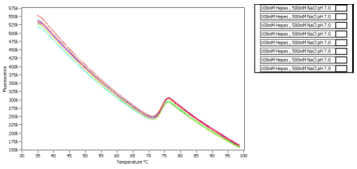
Protein Denaturation Melt Curve Assay

The ability to run precision temperature gradients greatly expands the possible applications for the Genie® II platform. User-defined thermal controls allow for highly accurate measurements in thermal shift detection e.g. protein stability/denaturation analysis.

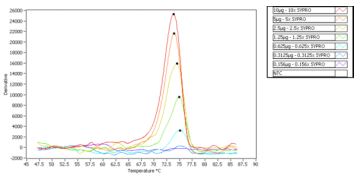
One such method monitors the fluorescence of SYPRO®-Orange, which increases when bound to the hydrophobic patches exposed upon protein denaturation. When plotted against temperature, the stability of a protein, or melting temperature (e.g. Tm) can be accurately measured. A high melting temperature indicates high protein stability.

25µl reaction containing: 1-10µg protein, 1-10x SYPRO®-Orange, 1x Buffer (100mM HEPES, 500mM NaCl, pH7-9.0). 35-99°C gradient (0.05°C/sec).

Fluorescence is plotted against temperature to produce a melt curve specific to the protein under test.



Protein melt curve replicates: 10µg protein with 10x SYPRO®-Orange

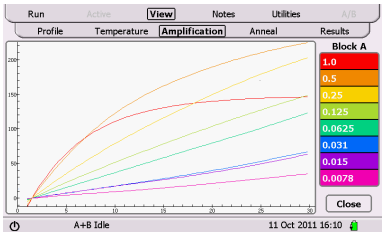


Protein melt fluorescence derivative plot: 0.156-10µg protein with 0.156x—10x SYPRO®-Orange

Determination of Enzyme activity

A thermostable ribonuclease H, *RNaseH*, enzyme was needed for a novel assay. The recombinant enzyme was purified from *E.coli* and tested for activity by following cleavage of a novel Fluorescein-DNA-RNA-DNA-Quencher oligonucleotide annealed to a it's complementary DNA oligonucleotide. Cleavage of the RNA/DNA duplex by an *RNaseH* enzyme would release the fluorescein and result in an increase in fluorescence.

A 1 in 2 dilution series of purified enzyme was assayed on a Genie® II instrument monitoring continuous fluorescence at 65°C.



Profile of dilution series of enzyme monitored using continuous fluorescence

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Isothermal Mastermix

This isothermal amplification mix allows fluorescence detection of the product on the Genie® II platform but may also be used on generic qPCR instrumentation. An anneal curve can then be generated to confirm the product. This eliminates the need for gel electrophoresis or turbidity detection and allows for a closed-tube system.

OptiGene Isothermal Mastermixes are fully licensed for LAMP use by Eiken Chemical Company.

OptiGene Isothermal Mastermix can be used with RCA, SMAP and many other amplification technologies.

Genie® II strips

Genie® II uses a proprietary tube strip that maximises optical and thermal efficiencies with a locking cap providing a closed-tube system.

The strips have the following advantages.

- Seal-and-lock mechanism to prevent contamination
- Individually capped
- Non-fluorescent and optically clear
- Wings for ease of handling
- Raised rim for foil sealing
- Each strip has 8-tubes with a working volume of 20 — 150 µl.

Genie® II Strip Holder

The Genie® II strip holder allows you to set up your reactions quickly and easily. The holder can also act as a cool block.

Genie® II Carry case

We are able to provide a robust carry case for Genie® II allowing you to safely transport or store your Genie® II.

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