Healthier Future for
Humanity with Genomic Technology

BIONEER
Innovation • Value • Discovery

Real-Time PCR System

ExiCycler™ V5

Ver.1 (EN) | 2024-04-02

ExiCycler™ V5 Real-Time PCR System
The Compact and Complete Solution

ExiCycler™ V5 is an innovative Real-Time PCR device that applies Bioneer's patented technology, providing researchers with accurate and fast experiment execution. With a maximum ramp rate of 10.0℃/sec*, it minimizes experiment time and supports researchers in conducting highly efficient and accurate studies.

*Fast model only

Features and Benefits

- **Fast Ramp Rate and CMOS Sensor Equipped Camera**
  Utilizing a high-speed ramp rate through special alloy blocks, innovative temperature control technology, and a high-resolution CMOS sensor to shorten experiment time and maximize experimental efficiency.

- **Support for Multiple Fluorescent Channels**
  Supports six fluorescent channels capable of applying a total of 10 fluorescent dyes including FAM, TET, TAMRA, Texas Red, Cyanine5, and ATTO425, enabling simultaneous detection of multiple genes.

- **Guaranteed Stability through Patent Technology**
  Application of globally patented optical technology ensures stability of experiments and accuracy enhancement of results.

- **Increased versatility with two capacity options***
  Equipped with a sealed Gap plate, allowing the use of 0.1 ml and 0.2 ml tubes/plates with just one device without the need for block replacement.
  *96 well only

- **Independent and convenient operation**
  With a 10.1-inch touchscreen and user-friendly UI, no separate PC is required.

- **Applicable to various fields of experimentation**
  With rapid and accurate Real-time PCR experiment results, it can be applied to various fields of experimentation such as SNP Analysis, expanding research diversity.

Prompt Test, Accurate Result

- Maximize experimental efficiency by applying highest ramping rate 10.0℃/sec* *Fast model only
- Improved temperature control algorithm for enhanced temperature adjustment speed
- Increased experimental reproducibility due to reduced temperature deviation between wells to 0.4℃(±0.2)
- Easy optimization with precise Thermal Gradient Function

*Patent pending

Ⓐ Normal model – Aluminum Thermal Block

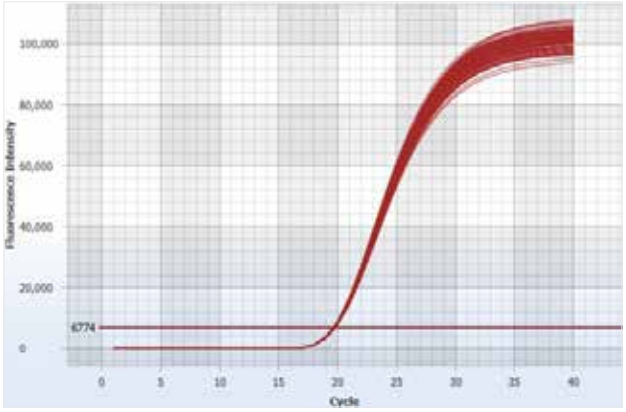
Ramping rate: 8.0℃/sec

Ⓑ Fast model – Nano-metal Alloy Block

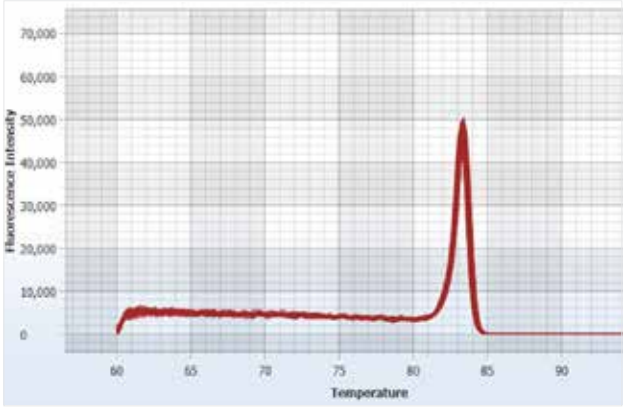
Ramping rate: 10.0℃/sec

Instrument (96 wells)	Ramping rate	Running time
ExiCycler™ V4	4.5℃/sec	1 h 10 min
ExiCycler™ V5 (Fast)	10.0℃/sec	44 min

Experiment time **reduced by over 20 minutes** compared to the previous version!



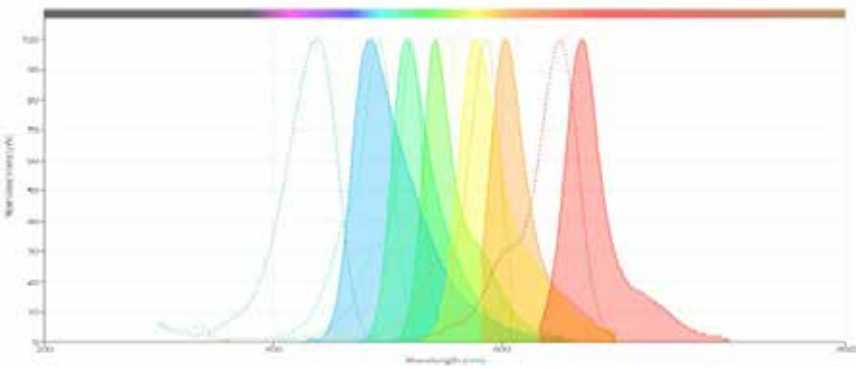
	Average	Max-Min	STDEV	CV(%)
Ct	19.68	0.24	0.06	0.30



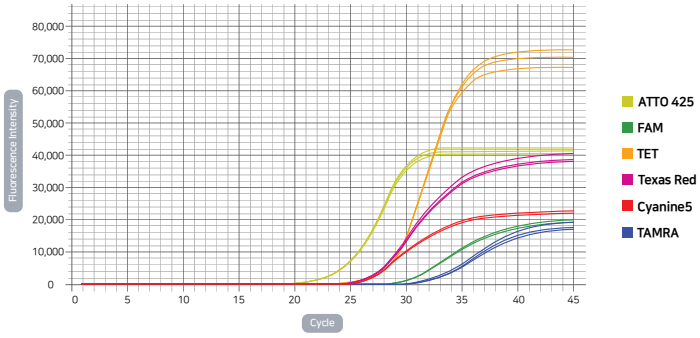
	Average	Max-Min	STDEV	CV(%)
Tm	83.3	0.30	0.08	0.10

With *ExiCycler*™ V5's swift temperature control algorithm and minimized temperature deviation between wells, uniformity of results is ensured across all 96 wells. Complete your experiment with high reliability results without edge effects.
(The graph and table above show the results of simultaneous experimentation on all 96 wells using 10^7 copies of the human HPRT1 gene.)

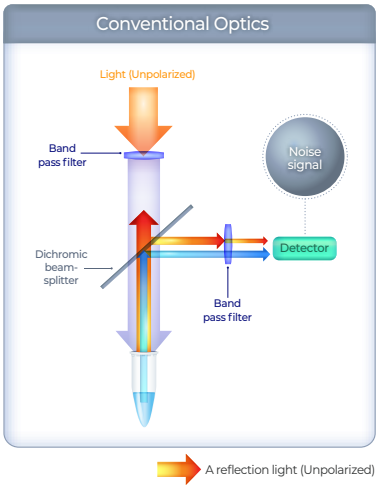
- True 6-channel multiplexing without reference dye
- Excellent sensitivity and accuracy via patented Light Polarization Technology
- Improved stability and reproducibility with semi-permanent White LED
- Reduced scan time with high-sensitivity CMOS sensor, decreased experiment time

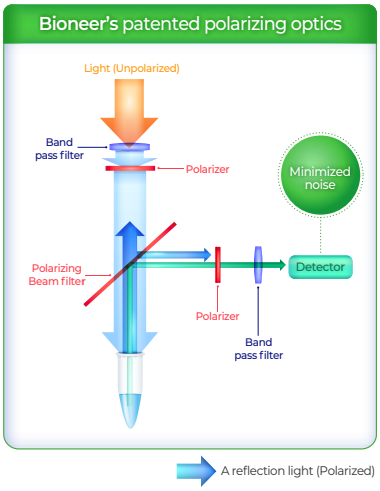


Filter	Excitation (nm)	Emission (nm)	Fluorescent dye
F0	430	480	ATTO425
F1	470	520	FAM, SYBR® Green 1
F2	515	550	JOE, TET
F3	550	585	TAMRA, Cyanine3
F4	570	615	Texas Red®, ROX
F5	630	690	Cyanine5



With its excellent optical design,
ExiCycler™ V5 minimizes deviations between wells, eliminating the need for reference dye.
It enables true 6-channel multiplex qPCR with a wide Excitation/Emission detection range (430-690 nm).





Bioneer's Patented Light Polarization Technology

Unlike conventional qPCR instruments, Bioneer's *ExiCycler*™ processes fluorescence and excitation light with polarizations of different polarities. This technology minimizes noise caused by reflected light and enhances sensitivity, providing highly accurate results.

Patent registration number
KR 1089045, US 8427643, JP 5204842, CN 101784672, EU 2160476

Intuitive Running, Optimized Analysis

- Convenient operation with an intuitive User Interface on a 10.1-inch touchscreen
- Easily create protocols and view result graphs in real-time without the need for PC connection
- Access to previous experiment files with the implementation of Open Data File technology

Running Software

Main Screen

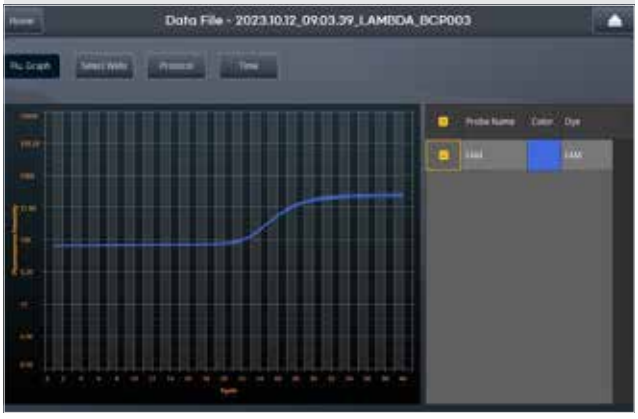
Probe Setting

Protocol

Time

Fluorescence Graph

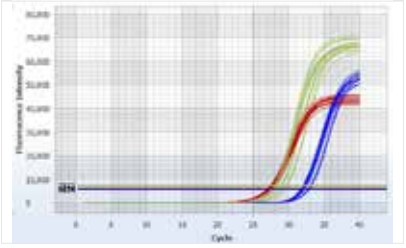
Open Data File



- Providing customized analysis tools tailored to the user's research objectives
- Supporting visual data for various fields of experimentation

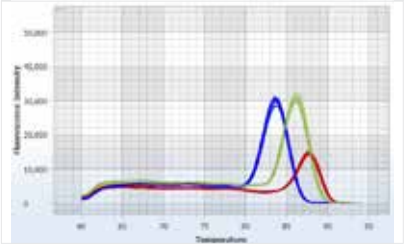
Analysis Software

Fluorescence Graph



Fluorescence values of amplified wells are measured after each PCR cycle, and result (C_T) are determined based on the set threshold.

Melting Curve Analysis

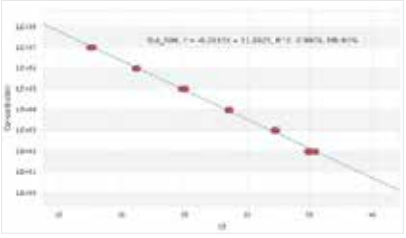


In experiments using DNA binding dyes, the occurrence of non-specific amplification of nucleic acids is checked.

SNP Analysis

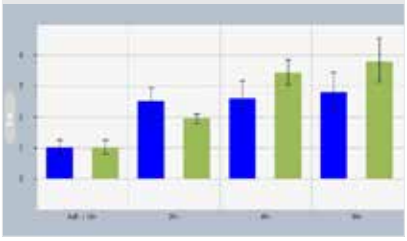
Single nucleotide polymorphisms (SNPs) within the target DNA sequences are analyzed through cluster plots in the experiment.

Absolute Quantification



Known concentration samples are diluted to a certain ratio to construct a standard curve. Measurement values obtained from the desired samples are then quantified by substituting them into the standard curve.

Relative Quantification



The relative expression level of a target gene in unknown samples, which contain the target gene, is analyzed with a reference to a housekeeping gene as a standard.

Existence/Non-Existence Assay

It is used to determine the presence or absence of specific nucleotide sequences within the sample. A threshold is set using positive/negative control groups, and the experimental group is analyzed based on this threshold.

Applications

- Gene Expression Analysis using Absolute & Relative Quantification
  Messenger RNA (mRNA) and other genetic materials are quantified in various samples to analyze and compare the expression patterns of specific genes. These gene expression analysis results can be applied to various fields, including disease research and drug efficacy studies.

- Pathogen Detection using Existence/Non-Existence Assay
  Using primers/probes specifically designed for pathogens with known nucleotide sequences such as viruses, bacteria, fungi, and parasites, detection experiments for these pathogens can be performed from various samples.

- Genotyping/Allelic Discrimination using SNP Analysis
  It involves analyzing differences in nucleotide sequences at specific loci within genes as a process to understand the genetic diversity of each individual. Through this, research on the genotype-phenotype relationship can be conducted in various organisms, including humans.

In addition, through the convenient analysis tools provided by *ExiCycler*™ V5, you can perform various research tasks, including Copy Number Variation Analysis, miRNA Expression Analysis, Methylation Analysis, GMO Detection.

Specification

General specifications				
Dimension (cm)	32 cm × 44.5 cm × 51.5 cm		Weight (kg)	29.2 kg
Well capacity	96-well		384-well	
Sample volume	10-50 µl (0.1 ml tube/plate) 20-50 µl (0.2 ml tube/plate)		5-20 µl (0.02 ml plate)	
Operating temperature	15-35℃		Operating humidity	20-80%, no condensation
Operating system	Built-in (Windows 10 IoT)		User interface display	10.1 inch touch screen LCD
Thermal module specifications				
Method of heating/ cooling	Peltier			
Maximum ramp rate	96 Normal	8.0℃/sec	96 Fast	10.0℃/sec
	384 Normal	5.5℃/sec	384 Fast	7.0℃/sec
Temperature accuracy	±0.2℃		Temperature uniformity	Normal: ±0.2℃, Fast: ±0.3℃
Gradient range	30-95℃ (between 1-20)			
Optical specifications				
Light source	White LED		Sensor	CMOS
Excitation/Emission filter	6 sets (430-690 nm)			
Compatible dyes	F0: ATTO425, F1: FAM/SYBR® Green I, F2: JOE/TET, F3: TAMRA/Cyanine 3, F4: Texas Red®/ ROX, F5: Cyanine 5			

* ATTO is a trademark of ATTO-TEC GmbH. SYBR and Texas Red are a registered trademark of Molecular Probes, Inc. FAM, JOE, TAMRA, TET and ROX are trademark of Applera Corporation or its subsidiaries in the US and/or certain other countries.

Ordering Information

ExiCycler™ Real-Time PCR System	Cat. No.
ExiCycler™ V5 96	A-2065-1
ExiCycler™ V5 96 Fast	A-2065-2
ExiCycler™ V5 384	A-2065-3
ExiCycler™ V5 384 Fast	A-2065-4

Related Products

qPCR Reagents	Cat. No.
AccuPower® *DualStar*™ qPCR PreMix	K-6100~4 / K-6110~4
AccuPower® *GreenStar*™ qPCR PreMix	K-6200~4 / K-6210~4
AccuPower® 2X *GreenStar*™ qPCR Master Mix	K-6251~4
AccuPower® Plus *DualStar*™ qPCR PreMix & Master Mix	K-6600~3
AccuPower® Plus *DualStar*™ qPCR PreMix & Master Mix (with UDG)	K-6605~8
RT-qPCR Reagents	**Cat. No.**
AccuPower® *GreenStar*™ RT-qPCR PreMix & Master Mix	K-6400 / K-6403
AccuPower® *Dual-HotStart*™ RT-qPCR PreMix & Master Mix	K-6704~7
Plastic Consumables	**Cat. No.**
Adhesive Optical Sealing Film (100 sheets)	3111-4110
Opaque White PCR Tube & Plate	3111-50, -52, -53

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