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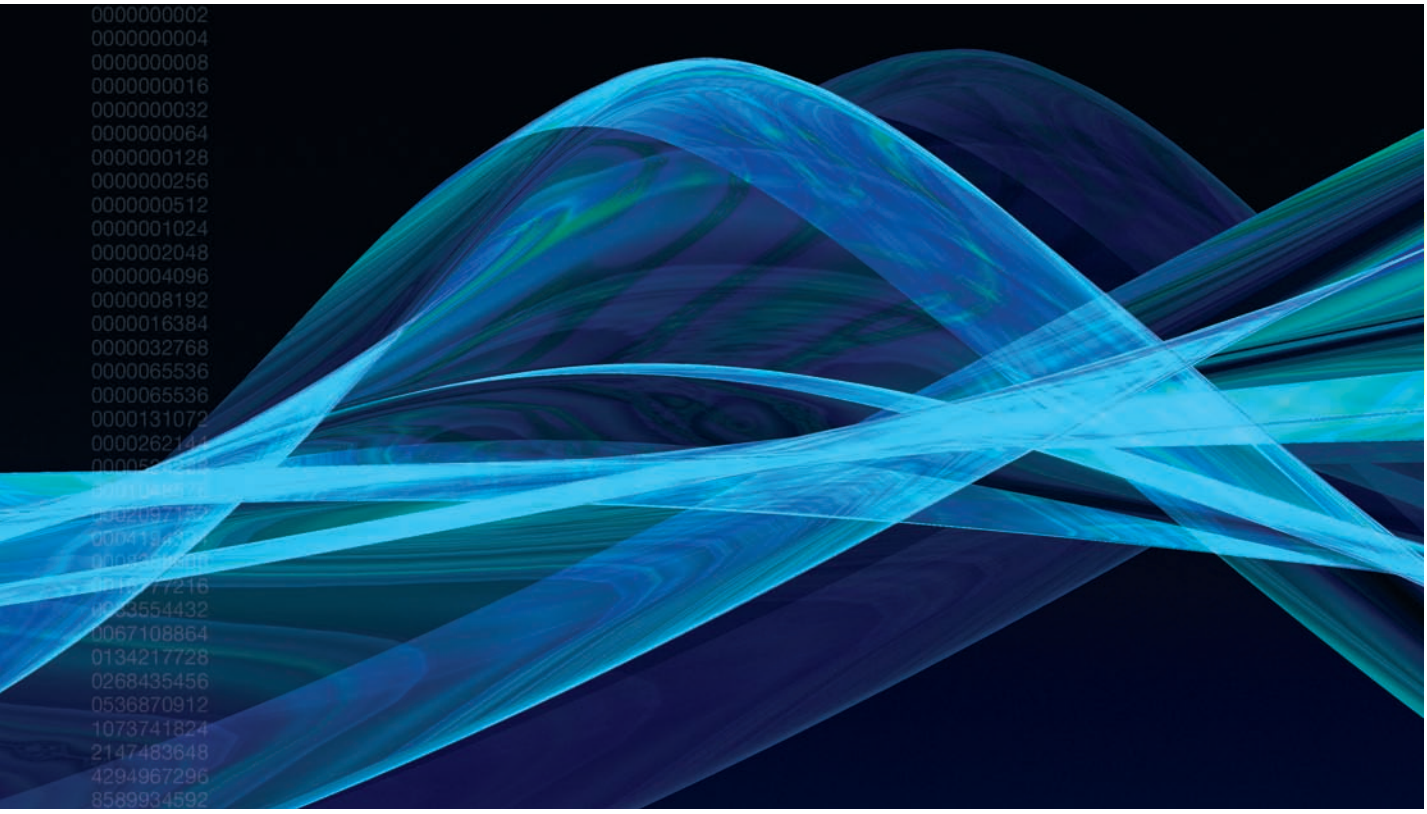
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DNA Engine®
Thermal Cyclers

BIO-RAD

One just right for you …

The DNA Engine family of cyclers is our premium value instrument platform, combining the most advanced thermal technologies with unparalleled flexibility. The hallmark of the DNA Engine family — the Alpha™ unit — allows you to adjust your cycler's capacity and vessel accommodation as your research needs evolve.



Alpha Units

- Interchangeable reaction modules



DNA Engine Thermal Cycler



- Upgradable to DNA Engine Opticon® 2 and Chromo4™ real-time systems

DNA Engine Dyad® Thermal Cycler



- Dual-bay cycler with advanced graphical interface

Dyad Disciple™ Thermal Cycler



- Directed by an attached DNA Engine Dyad cycler or PC; upgradable to Chromo4 real-time system

DNA Engine Tetrad® 2 Thermal Cycler



- Updated version of the cycler that powered the Human Genome Project

Dyad™/Dyad Disciple Cycler Tandem



- Choice of two space-saving configurations



Interchangeable formats for changing demands

Installing an Alpha unit requires no tools — Alpha units can be rapidly exchanged to accommodate various vessel types and a range of sample capacities.

Alpha Units — The Heart of the DNA Engine Thermal Cycler

Alpha units are swappable sample-block/heat-pump assemblies that can be used to customize any thermal cycler in the DNA Engine family. More than ten Alpha unit formats have been developed to accommodate the diverse needs of modern laboratories. Alpha units are distinguished by their number of sample blocks (one or two), their sample capacity, and their lid type. The Chromo4 real-time PCR detector also incorporates an Alpha unit.

Each Alpha unit contains thermoelectric heat pumps and sensors to modulate sample temperatures, while the thermal cycler chassis delivers electric power and appropriate software control. The pioneering multisensor, multizone temperature control provides superb temperature uniformity across a sample block, producing consistent temperature profiles across samples and between subsequent runs. Each Alpha unit is meticulously temperature-qualified using NIST-traceable standards, ensuring comparable performance regardless of format or thermal cycler chassis used. In fact, frequent changing does not affect thermal performance of Alpha units, and protocols established on one instrument can be readily transferred to other cyclers in the DNA Engine family.



Reaction Module Options





Standard Alpha units feature adjustable heated lids that are manually set to optimize the sealing pressure for diverse types of vessels and sealers. The amount of pressure is adjusted with the use of a thumbwheel, and the lid temperature is set with the thermal cycler software.

Single-Block Alpha Units — 96-well single blocks are gradient capable.

96-well	Holds 96 x 0.2 ml tubes, one 96-well plate, or up to 30 x 0.5 ml tubes
384-well	Holds one 384-well plate
60-well	Holds 60 x 0.5 ml tubes
Flat Block™	Holds microarrays, biochips, or flat-bottom vessels

Dual-Block Alpha Units — Dual Alpha units are independently controllable, so separate protocols may be run side by side.

48/48-well	Holds 2 x 48 x 0.2 ml tubes or up to 2 x 12 x 0.5 ml tubes
30/48-well	Holds 30 x 0.5 ml and 48 x 0.2 ml tubes
30/30-well	Holds 2 x 30 x 0.5 ml tubes



Slide Chambers™ Alpha units thermally cycle glass microscope slides in a dual-block format, with each block holding up to 16 slides. These units are designed for in situ techniques and humidified chamber hybridizations.

Slide Chambers Dual-Block Alpha Units — The two chambers are independently controllable, so separate protocols may be run side by side.

16/16 block	Holds 2 x 16 glass slides
16/16 block	Holds 2 x 16 glass slides, reverse mounted for DNA Engine Tetrad cyclers



Moto Alpha™ units are equipped with motorized heated lids and are designed for automation, low-volume cycling, and high-throughput applications. The sealing pressure and opening angle are set with the software and may be controlled remotely from a PC.

Moto Alpha Units — Moto Alpha units are available in single-block formats only; 96-well single blocks are gradient capable.

96-well	Holds 96 x 0.2 ml tubes, one 96-well plate, or up to 30 x 0.5 ml tubes
384-well	Holds one 384-well plate
Flat Block	Holds microarrays, biochips, or flat-bottom vessels



The Chromo4 detector is a real-time PCR detector mounted on a 96-well gradient Alpha unit and equipped with a user-changeable photonics shuttle for four-color excitation and detection. The Chromo4 detector uses long-lived LEDs for excitation and uses sensitive photodiodes for detection, ensuring accurate results from start to finish.

Chromo4 Detector — The Chromo4 detector requires an external PC, and is gradient capable.

96-well	Includes optical housing, 96-well sample block, photonics shuttle, and analysis software

DNA Engine Family Thermal Cyclers

A True Platform

The DNA Engine family includes 1-, 2-, and 4-bay thermal cyclers, with each model delivering equivalent thermal performance. Multibay systems allow each Alpha unit to be independently controlled, and with Dual Alpha™ units, two different protocols can be run side by side in a single bay. For instance, a four-bay DNA Engine Tetrad 2 cycler, when outfitted with four Dual Alpha units, can run up to eight independent protocols simultaneously.

DNA Engine Cycler

The popular single-bay DNA Engine cycler, the namesake of the product line, revolutionized thermal cycling when introduced in 1994. The DNA Engine cycler was the first to provide a high level of thermal performance with swappable blocks and an elegant compact design. The DNA Engine cycler can be converted to a DNA Engine Opticon 2 system dedicated to two-color real-time PCR, or it can be used with the swappable Chromo4 four-color real-time PCR detector.



DNA Engine Dyad Cycler

The dual-bay DNA Engine Dyad thermal cycler features a high-density graphical interface and color display. Point-and-click navigation through the software enables rapid input of protocols. For laboratories expecting increased sample throughput, the DNA Engine Dyad can be expanded to a four-bay system with the addition of a Dyad Disciple thermal cycler.



Dyad Disciple Cycler

The Dyad Disciple thermal cycler converts the DNA Engine Dyad instrument to a 4-bay thermal cycler, or it may be run independently with a desktop PC. The Dyad Disciple cycler connects to a DNA Engine Dyad cycler or a PC running Windows OS and outfitted with Disciple Desktop™ freeware. For remote operation in robotic workstations, the Dyad Disciple cycler is an excellent choice due to its small size and economical price. The Dyad Disciple cycler can be upgraded to real-time PCR capability using a Chromo4 detector with Opticon Monitor™ software run through an attached PC.



DNA Engine Tetrad 2 Cycler

The DNA Engine Tetrad 2 thermal cycler features the advanced graphical interface found on the DNA Engine Dyad cycler integrated onto a space-saving four-bay cycler design. The high-capacity DNA Engine Tetrad served as the thermal cycling backbone for the Human Genome Project. With the advanced programming interface and increased file management tools, the DNA Engine Tetrad 2 cycler is preferred for high-throughput cycling in both research and production environments.



High-Performance Technology for Unparalleled Results

The integrity of the DNA Engine family of thermal cyclers rests on the performance of Peltier heat pumps (thermoelectric modules, or TEs). Advanced hardware and software designs are used to reliably provide heating and cooling to every sample — regardless of position on the block, sample volume, or level of throughput. The practical result of these technologies is that PCR protocols can be quickly optimized, validated, and used with confidence in any DNA Engine family cycler.

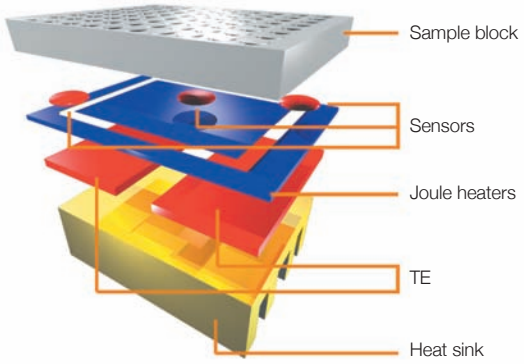
Multizone Thermal Control

Multiple zones of thermal control across sample blocks enable the DNA Engine family of cyclers to deliver remarkable well-to-well temperature uniformity (±0.4°C). Precise Joule heaters adjust the temperature of perimeter wells — where thermal losses to radiative heat are the highest — independently of center wells. Sophisticated algorithms use readings from three sensors in a single-block Alpha unit to adjust four independently controlled thermal zones (left, right, inner, and outer), quickly bringing the sample block to uniformity even when samples are asymmetrically loaded.

Block vs. Calculated Temperature Control

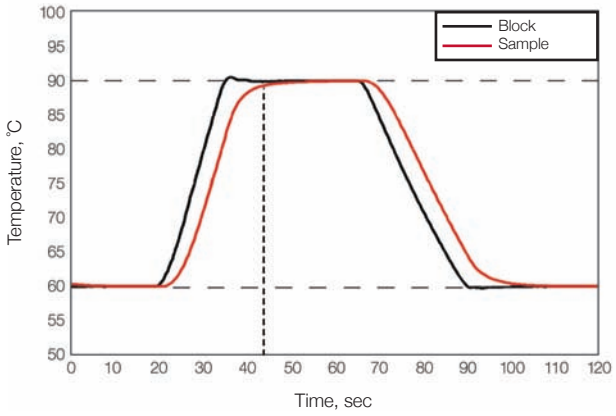
The DNA Engine family of thermal cyclers offers two modes of controlling sample temperatures. With the simplest method, block temperature control mode, the instrument monitors the temperature of the block and precisely heats and cools as directed. When the temperature within a sample is measured, however, an almost asymptotic lag can be detected as heat is transferred from block to vessel to sample (upper panel, opposite).

As an alternative, cyclers in the DNA Engine family also offer a calculated temperature control mode. With this option, an algorithm that incorporates the sample volume and vessel type is used to calculate the temperature overshoot required to bring the sample to the programmed temperature rapidly (lower panel, opposite). Incubation periods are timed according to how long the samples, not the block, reside at target temperature. By removing some guesswork, calculated control can reduce both optimization time and overall run time. Calculated control is recommended for most applications.

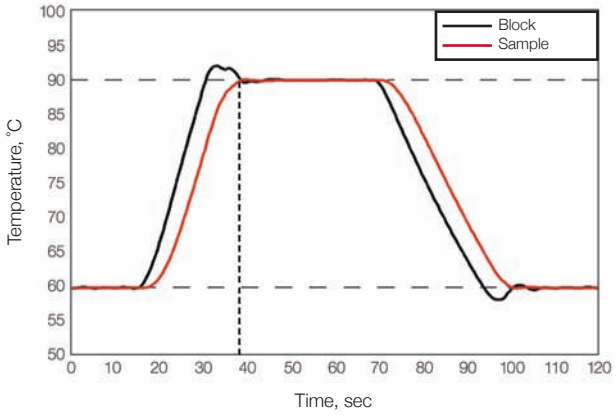


Block assembly diagram of an Alpha unit. Precise Joule heaters adjust perimeter wells where thermal losses to radiative heat are the highest. Multiple sensors and independently controlled TEs compensate for asymmetrically loaded samples.

Block Temperature Control



Calculated Temperature Control

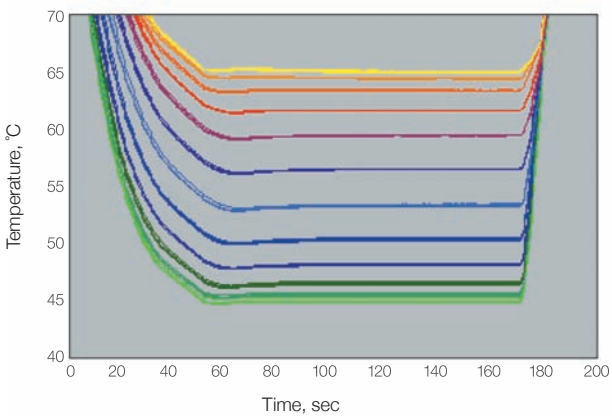


Block vs. calculated temperature control. Temperatures were ramped from 60–90°C using a 96-well Alpha unit on a DNA Engine cycler with 0.2 ml tubes and a 25 µl sample volume. The block temperature overshoot with calculated temperature control mode (bottom panel) results in the sample reaching the target temperature (vertical dashed line) approximately 5 sec earlier than with block temperature control mode.

Gradient Feature and Dynamic Ramping

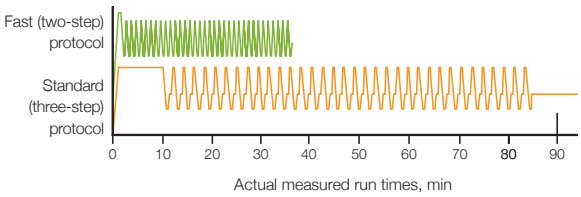
Multizone technology allows cyclers in the DNA Engine family to create a highly reproducible temperature gradient across the sample block using software alone. The gradient feature allows optimization of reactions in a single experiment using a range of temperatures simultaneously. Temperature gradients ranging from 1˚C up to 24˚C can be programmed across a 96-well sample block. The gradient feature employs dynamic ramping, which means that the temperature gradient forms during ramping. All wells come to their designated temperature at the same time, making the incubation period consistent across all samples.

Accurate incubation times are crucial for successful transfer of protocols from a gradient to a nongradient mode.



Dynamic ramping in gradient mode. Four thermal cyclers were programmed to develop a 45–65°C gradient across 12 columns. Thermal measurements were taken with NIST-traceable, laser-trimmed thermistors from 48 wells (4 wells/column) in each cycler. Mean temperature of each column in each cycler (48 total traces) is plotted. Note that the software adjusts ramp rates so that all samples reach the incubation temperature at the same time.

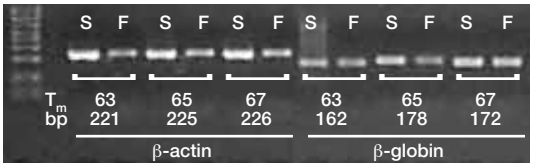
Performing Fast PCR With Bio-Rad Products



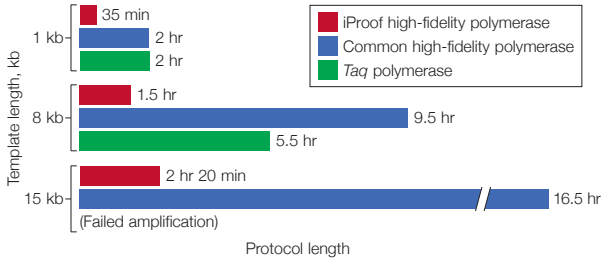
PCR run times can be dramatically reduced without giving up the flexibility, modularity, and gradient capability of Bio-Rad thermal cyclers. With our cyclers, enzymes, and reaction vessels, you can:

- Shorten PCR runs from 1.5 hours to 35 minutes
- Reliably amplify long (1 kb), longer (8 kb), and extra-long (15 kb) targets 3–4 times faster than with standard protocols
- Obtain SYBR Green real-time PCR quantitation data in <40 minutes with any Bio-Rad real-time PCR system

To download a fast PCR tutorial, go to **www.bio-rad.com/fastpcr/**



Fast two-step protocol results are comparable to those generated using standard protocols. β-actin and β-globin targets were amplified from human genomic DNA using iTaq™ polymerase. Standard (S) protocol, 1.5 hr, fast (F) protocol, 35 min. For details, go to www.bio-rad.com/fastpcr/



For long 1–15 kb targets, use of iProof™ polymerase reduces run times 3- to 4-fold. Targets of 1, 8, or 15 kb were amplified using three different polymerases. A two-step PCR protocol was used with iProof polymerase; three-step protocols using the shortest recommended extension times were used with other polymerases. Because iProof polymerase requires an annealing temperature 5–8°C above typical annealing temperatures, two-step protocols often can be run without redesigning primers.

Low-Volume Cycling and Robotics

The DNA Engine family is a top choice for high-throughput and automated environments. DNA Engine line cyclers boast the smallest footprint available, are readily networked, and can be remotely operated using a universal set of ASCII commands. Over the years, our scientists have partnered with many leading robotics manufacturers to offer the most flexibility for incorporating thermal cyclers into spatially constrained workstations.



For especially tight integrations, we've developed the Remote Alpha Dock™ (RAD) system, which allows an Alpha unit to be operated up to 3 meters away from any DNA Engine line cycler chassis. The two-bay Dyad Disciple cycler is particularly suited for automation — having the smallest possible per-bay dimensions. Historically, the DNA Engine Tetrad cycler, with a 1,536-sample capacity when equipped with four 384-well Alpha units, has been the favored instrument for high-throughput laboratories, while the DNA Engine cycler remains popular for lower-throughput robotic applications.

The Moto Alpha Unit

The Moto Alpha unit is the final element needed for fully automated thermal cycling — offering remote lid opening and closing, high-pressure sealing, and a number of other robot-friendly features. When used with Hard-Shell® PCR plates and Microseal® 'P+' sealing pads, optimal performance can be expected. Features of the Moto Alpha lid include:

- Motorized heated lid can be operated directly or remotely
- High sealing pressure is applied evenly across every well so low-volume (1–5 µl) cycling can be performed reliably
- Active pressure sensing ensures repeatability
- Stainless lifter springs present the microplate 5 mm above the block for robotic access
- Sealing pressure and opening angle are set with software

Key Accessories for Automation

Hard-Shell 96- and 384-well PCR plates contain a rigid skirt designed to resist warping and shrinkage caused by the thermal stresses of high-temperature cycling. The absence of plate deformation ensures reliable robotic gripping of plates while maintaining the flatness and well spacing necessary for reproducible pipetting.



Bio-Rad's **arched auto-sealing lids** allow simple automation of sealing, opening, and resealing plates without the need to integrate costly automated sealing and unsealing workstations. Arched auto-sealing lids automatically release from microplates when the cycler is opened, and therefore are ideal for repeated access.



In contrast, **flat auto-sealing lids** remain tightly sealed to the microplate for up to 24 hours after cycling, and can be used for short-term storage down to –20°C. The lids contain sealing pads that are easily cleaned between uses and are reusable up to 50 times. For cycling of low-volume reactions (1–3 µl), flat auto-sealing lids form an extremely tight, reliable seal when used with the Moto Alpha motorized lid. Evaporative losses of low-volume samples during dispensing are also reduced 5-fold by placing an auto-sealing lid over a reaction plate as soon as the plate is filled.

Microseal 'P+' pads use the same sealing pad as auto-sealing lids, but in a format that can be adhered directly to a motorized cycler lid. Ejector pins in the lid ensure that the plate will not stick to the lid when the cycler is opened.

Real-Time PCR in Two or Four Colors

Real-time quantitative PCR is a highly sensitive technology that combines DNA amplification with simultaneous process monitoring. Accumulation of labeled product is optically monitored as the amplification reaction progresses. By comparing the rate of product accumulation between a set of known standards and a set of experimental samples, the initial quantity of template in the unknown samples can be assessed. Real-time analysis is a powerful technique used in many applications, including gene expression profiling, quantitation of DNA and RNA targets, microbial detection, and viral load determination.

DNA Engine Opticon 2 System

The DNA Engine Opticon 2 system is a dedicated two-color real-time detection system that is built around a DNA Engine cycler with a 96-well gradient Alpha unit. The DNA Engine Opticon 2 system features a unique optical design incorporating fixed-LED excitation and photomultiplier tube detection. This system provides a broad linear dynamic range of detection, including detection of single-copy targets, without any moving parts.



The Chromo4 Detector

The Chromo4 four-color real-time PCR detector allows reversible configuration of a DNA Engine or Dyad Disciple thermal cycler into a real-time system. The Chromo4 detector, which incorporates a swappable 96-well gradient Alpha unit, permits multicolor detection for multiplexing or for detecting a variety of targets using various dye chemistries. The compact Chromo4 detector features a photonics shuttle that can be ordered with customized filter sets to tailor the detection capability to your specific needs.



Reaction Vessels and Sealers

	0.5 ml Tubes	Full-Height 0.2 ml Tubes and Strip Tubes	Low-Profile 0.2 ml Strip Tubes	Multiplate™ Unskirted PCR Plates	Low-Profile Multiplate Unskirted PCR Plates	Microseal 96-Well Semi-Skirted PCR Plates	iQ™ 96-Well Semi-Skirted PCR Plates	Concord™ 96-Well Skirted PCR Plates	Microseal 96-Well Skirted PCR Plates	Hard-Shell 96-Well Skirted PCR Plates	Hard-Shell 384-Well Skirted PCR Plates
											
PCR reaction volume	10–200 µl	5–125 µl	5–125 µl	5–125 µl	5–125 µl	5–125 µl	5–125 µl	20–150 µl	5–125 µl	5–125 µl	3–30 µl
Maximum well volume	600 µl	250 µl	200 µl	330 µl	200 µl	330 µl	330 µl	210 µl	220 µl	250 µl	50 µl
Suggested when using fewer than 96 wells	•	•	•	•	•		•				
For automation									•	•	•
Color-coded skirts with clear wells										•	•
Bar coding available									•	•	•
White wells available			•	•	•	•			•	•	•
Black wells available			•	•		•			•	•	•
Alpha block compatibility	60-, 30-, 16-well	96-, 48-, 25-well	96-, 48-, 25-well	96-, 48-, 25-well	96-, 48-, 25-well	96-well	96-well	96-well	96-well	96-well	384-well
iCycler® and MyCycler™ block compatibility	60-well	96-, 48-well		96-, 48-well		96-well	96-well				384-well

	Microseal 'A' Film	Microseal 'B' Seal	Optical Film Sealing Kit	96-Well PCR Plate Sealing Mats	Microseal 'F' Foil	Microseal 'P' Pad	Microseal 'P+' Pad	Auto-Sealing Lids	Chill-out™ Liquid Wax Overlay	Domed Strip Caps	Optical Flat Strip Caps
											
PCR volumes 96-well 384-well	≥10 µl ≥5 µl	≥10 µl ≥5 µl	≥5 µl		≥25 µl ≥5 µl	≥15 µl ≥10 µl	≥5 µl ≥4 µl	≥3 µl ≥1 µl	≥2 µl ≥2 µl	≥5 µl	≥5 µl
Recommended for use in Chromo4, DNA Engine Opticon 2, and MiniOpticon systems		•	•						•		•
Automated sealing is available							•	•	•	•	
Reusable sealer				•		•	•	•			
Cold storage compatibility		•	•		•			•	•	•	•
Seal can be pierced					•				•		
Adhesive-based seal		•	•		•						
Seals 0.2 ml tubes									•	•	•
Seals 96-well plates	•	•	•	•	•		•	•	•	•	•
Seals 384-well plates	•	•			•	•	•	•	•		
Seals Concord plates	•				•				•		
Suggested for cyclers without heated lids									•		

For more information, request bulletin 5258.

Specifications

	DNA Engine Cycler	DNA Engine Dyad Cycler	Dyad Disciple Cycler	DNA Engine Tetrad 2 Cycler
				
Sample capacity	Depends on Alpha unit used (holds 1)	Depends on Alpha units used (holds 2)	Depends on Alpha units used (holds 2)	Depends on Alpha units used (holds 4)
Speed of ramping*	Up to 3°C/sec	Up to 3°C/sec	Up to 3°C/sec	Up to 3°C/sec
Temperature range*	0–105°C	0–105°C	0–105°C	0–105°C
Temperature accuracy*	±0.3°C	±0.3°C	±0.3°C	±0.3°C
Temperature uniformity*	±0.4°C	±0.4°C	±0.4°C	±0.4°C
Input power	100–240 VAC,50–60 Hz, 400 W max	200–240 VAC, 50–60 Hz, 1600 W max fitted with NEMA L6-20P plug	200–240 VAC, 50–60 Hz, 1600 W max fitted with NEMA L6-20P plug	200–240 VAC, 50–60 Hz, 1600 W max fitted with NEMA L6-20P plug
Display	20 x 4 alphanumeric LCD	320 x 240 pixels, 256 colors	No display	320 x 240 pixels, 256 colors
Memory	400 typical programs	1,000 typical programs	No intrinsic memory	1,000 typical programs
Dimensions (W x D x H)	24 x 35 x 25 cm, chassis and Alpha unit	48 x 29 x 21 cm, chassis and Alpha units	46 x 28 x 21 cm, chassis and Alpha units	47 x 61 x 21 cm, chassis and Alpha units
Weight**	5.8 kg (12.8 lb)	10.4 kg (22.9 lb)	10.1 kg (22.3 lb)	21.6 kg (47.6 lb)
Thermal gradient accuracy***	±0.3°C	±0.3°C	±0.3°C	±0.3°C
Thermal gradient differential range***	1–24°C	1–24°C	1–24°C	1–24°C

* Some thermal specifications do not apply to dual-block and Slide Chambers Alpha units and PTC-100® 60-well block. For specifications for these units, visit **discover.bio-rad.com**

** Chassis only. 96-well Alpha unit weighs 3.2 kg (7.0 lb).

*** Gradient available with 96-well Alpha unit only.

Ordering Information

Catalog #	Description
DNA Engine Thermal Cycler Chassis	
PTC-0200G	**DNA Engine Thermal Cycler Chassis**, does not include Alpha unit (requires 1)
PTC-0220G	**DNA Engine Dyad Dual-Bay Thermal Cycler Chassis**, does not include Alpha units (requires 2)
PTC-0221G	**Dyad Disciple Dual-Bay Thermal Cycler Chassis**, does not include Alpha units (requires 2)
PTC-0240G	**DNA Engine Tetrad 2 Thermal Cycler Chassis**, does not include Alpha units (requires at least 2 and fits up to 4)
Alpha Units for DNA Engine Cyclers	
ALS-1238G	**384-Well High-Capacity Alpha Unit With Hot Bonnet® Heated Lid**, holds 384-well microplates
ALS-1260G	**60-Well Alpha Unit With Hot Bonnet Heated Lid**, holds 60 x 0.5 ml tubes
ALS-1296G	**96-Well Alpha Unit With Hot Bonnet Heated Lid**, holds one 96-well V-bottom plate or 96 x 0.2 ml tubes
ALS-1200G	**Flat Block Alpha Unit With Flat, Heated Inner Lid**, includes customizable flat-surface block with 4 screw-down points
ALD-1233G	**30/30 Dual Alpha Unit With Two Heated Lids**, 2 independent blocks, each holds 30 x 0.5 ml tubes
ALD-1244G	**48/48 Dual Alpha Unit With Two Heated Lids**, 2 independent blocks, each holds 48 x 0.2 ml tubes
ALD-1234G	**30/48 Dual Alpha Unit With Two Heated Lids**, 2 independent blocks, one holds 30 x 0.5 ml tubes, other holds 48 x 0.2 ml tubes
ALD-0211G	**16/16 Slide Chambers Dual Alpha Unit**, front-loading for DNA Engine, DNA Engine Dyad, and Dyad Disciple cyclers, 2 independent blocks, each holds 16 glass slides (25 x 75 mm), also suitable for humidified incubations
ALP-2296G	**Moto Alpha Unit With Integrated Motorized Heated Lid**, holds 96-well microplates
ALP-2238G	**High-Capacity Moto Alpha Unit With Integrated Motorized Heated Lid**, holds 384-well microplates
ALP-2200G	**Flat Block Moto Alpha Unit With Integrated Motorized Heated Lid and Flat Inner Lid**, includes customizable flat-surface block with 4 screw-down points
CFB-3240G	**Chromo4 Four-Color Real-Time PCR Detector**, includes optical housing, photonics shuttle, 96-well sample block, analysis software (complete system requires PTC-0200G or PTC-0221G)
CFB-322001G	**DNA Engine Opticon 2 Two-Color Real-Time PCR Detection System**, includes optical tower, DNA Engine thermal cycler, 96-well sample block, analysis software

Catalog #	Description
Cycling Accessories	
RAD-0200G	**Remote Alpha Dock System**, allows Alpha unit to be operated remotely from any DNA Engine family cycler (requires fan power supply)
RPS-0200	**Fan Power Supply**, for Remote Alpha Dock system, powers up to 4 docks
Dyad Disciple Accessories	
DAK-0241	**Rack Accessory**, places DNA Engine Dyad/ Dyad Disciple system in a vertical (stacked) configuration
DAK-0242	**Baffle Accessory**, provides spacing for proper airflow in DNA Engine Dyad/Dyad Disciple system in a horizontal (linear) configuration
DAK-0001	**Dyad Disciple USB Accessory Kit**, connects 2 Dyad Disciple cyclers to a PC for remote operation, includes USB hub, 5 USB cables
DAK-0000	**Dyad Disciple Power Strip Accessory Kit**, allows DNA Engine Dyad/Dyad Disciple cycler tandem to operate from a single 220 V outlet, includes powerstrip, 2 power cords
Core Reagents	
170-8870	**iTaq DNA Polymerase**, 5 U/µl, includes 250 U polymerase, 1.25 ml 10x PCR buffer, 1.25 ml 50 mM $MgCl_2$ solution
172-5301	**iProof High-Fidelity DNA Polymerase**, 2 U/µl, 100 U, includes 5x reaction buffers, $MgCl_2$ solution, DMSO
172-5302	**iProof High-Fidelity DNA Polymerase**, 2 U/µl, 500 U
172-5310	**iProof HF Master Mix**, 100 x 50 µl reactions, includes 2x master mix, DMSO (for highest fidelity with most templates)
172-5311	**iProof HF Master Mix**, 500 x 50 µl reactions

For more information on other products featured in this brochure, including the Chromo4 detector, DNA Engine Opticon 2 real-time system, reaction vessels, and sealers, visit us on the Web at **discover.bio-rad.com**

Purchase of this instrument conveys a limited non-transferable immunity from suit for the purchaser's own internal research and development and for use in applied fields other than Human In Vitro Diagnostics under one or more of U.S. Patents Nos. 5,656,493, 5,333,675, 5,475,610 (claims 1, 44, 158, 160–163 and 167 only), and 6,703,236 (claims 1–7 only), or corresponding claims in their non-U.S. counterparts, owned by Applera Corporation. No right is conveyed expressly, by implication or by estoppel under any other patent claim, such as claims to apparatus, reagents, kits, or methods such as 5' nuclease methods. Further information on purchasing licenses may be obtained by contacting the Director of Licensing, Applied Biosystems, 850 Lincoln Centre Drive, Foster City, California 94404, USA.

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BIO-RAD

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