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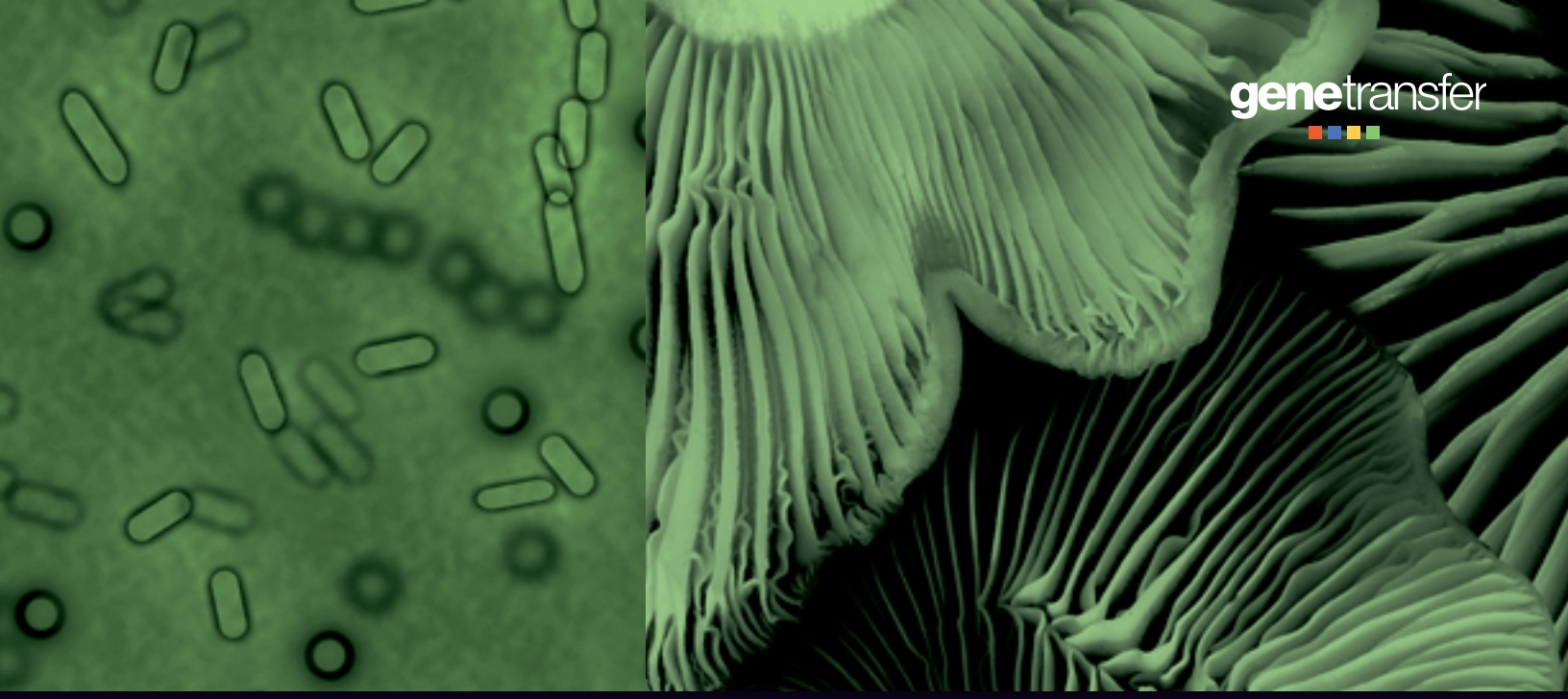
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MicroPulser™ electroporator

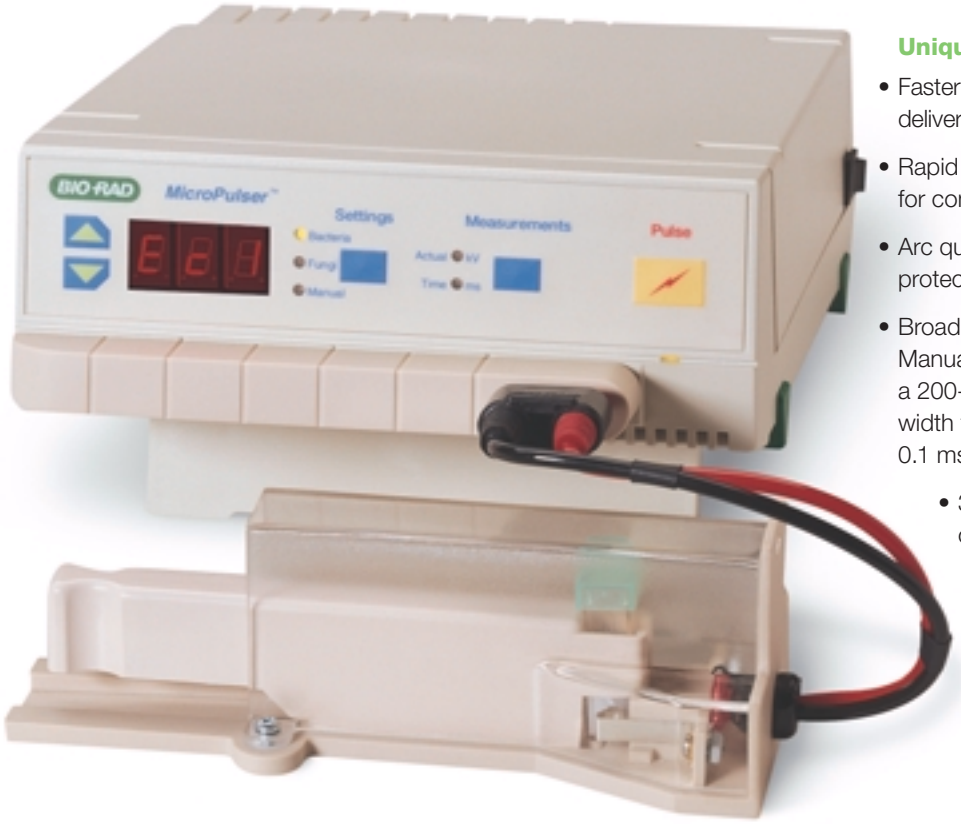


BIO-RAD

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A simple tool for transformation

The MicroPulser is a simple yet versatile electroporator that provides a safe and reproducible way for you to transform bacteria, yeast, and other microorganisms. Transformation efficiencies much higher than those obtained by chemical methods can be achieved by electroporation. A pulse is easily delivered by choosing a preset program and touching a single button.



Unique Features of the System Include:

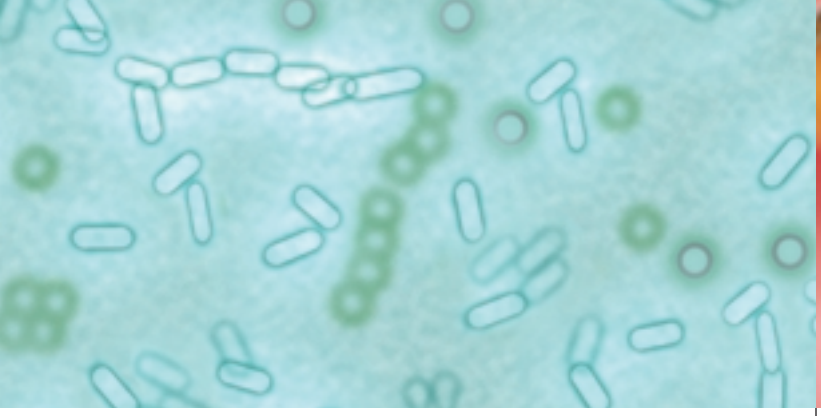
- Faster sample handling — Simple one-button pulse delivery, attached cuvette chamber, and rapid charge time
- Rapid program selection — Preset, optimized programs for commonly studied bacteria and fungi
- Arc quenching (ARQ) system that reduces arcing, protecting against loss of valuable samples
- Broad range of parameters for manual optimization. Manual programming allows voltage to be selected in a 200–3,000 V range with 10 V precision, and pulse width to be adjusted in a 1.0–4.0 ms range with 0.1 ms precision
- 3,000 V capability for improved efficiency in cuvettes with larger volume
- Compact, space-saving design
- Audible and visual pulse indicators
- Display of time constant and actual voltage delivered to monitor reproducibility

Programmed Functions

	Program	Species	Cuvette Size	Preset Conditions
Bacteria	Ec1	*Escherichia coli*	0.1 cm	1.80 kV, 1 pulse
	Ec2	*Escherichia coli*	0.2 cm	2.50 kV, 1 pulse
	StA	*Staphylococcus aureus*	0.2 cm	2.50 kV, 1 pulse, 2.5 ms
	Agr	*Agrobacterium tumefaciens*	0.1 cm	2.20 kV, 1 pulse
	Ec3	*Escherichia coli*	0.2 cm	3.00 kV, 1 pulse
Fungi	Sc2	*Saccharomyces cerevisiae*	0.2 cm	1.50 kV, 1 pulse
	Sc4	*Saccharomyces cerevisiae*	0.2 cm	3.00 kV, 1 pulse
	ShS	*Schizosaccharomyces pombe*	0.2 cm	2.00 kV, 1 pulse
	Dic	*Dictyostelium discoideum*	0.4 cm	1.00 kV, 1 pulse, 1.0 ms
	Pic	*Pichia pastoris*	0.2 cm	2.00 kV, 1 pulse

Unless the pulse time is truncated below 5 ms, the unit will deliver the optimal time constant of ~5 ms to samples in high-resistance media.

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Why Electroporation?

Efficient

Electroporation is the most efficient transformation method available. It is orders of magnitude more efficient than chemical methods and provides more reproducible results than any other method. The MicroPulser is designed to deliver optimum electrical conditions for electroporation of *E. coli*, fungi, and other microorganisms, resulting in the highest efficiencies possible. The preset conditions are optimized for common bacteria and fungi. Voltage and pulse time can also be set manually, enabling you to optimize transformation conditions for your experiment.

Compact and User-Friendly

The all-in-one design and preset conditions precisely deliver the optimal parameters for bacteria and fungi, established by Bio-Rad and verified in the literature over the years. This simple optimization allows efficient transformation, with a minimum of effort, in practically no time! The small footprint saves valuable benchspace.

Flexible

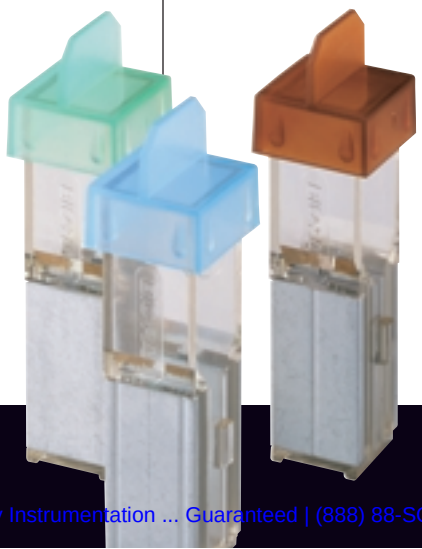
You can choose voltages between 200 and 3,000 V, to transform the widest range of microorganisms. By using a larger-capacity cuvette and increasing voltage to maintain the same field strength, you can process large samples and increase your throughput.

Cuvettes

Reproducible electroporation results require high-quality electroporation cuvettes for consistent pulse delivery to your valuable sample.

Bio-Rad Cuvette Features:

- High-quality construction for consistent performance
- Gamma-irradiated to ensure sterility
- Color-coded caps for easy identification
- Available in various package sizes



Example Results

	Species	Strain	Volume	Efficiency
Bacteria	*E. coli*	DH10B	20 µl	1.6×10^{10}
	E. coli	DH10B	20 µl	3.2×10^{9}
	S. aureus	RN4220	50 µl	1.2×10^{5}
	A. tumefaciens	LBA4404	20 µl	7.0×10^{6}
	E. coli	DH10B	20 µl	9.1×10^{9}
Fungi	*S. cerevisiae*	Sc948	40 µl	8.1×10^{4}
	S. cerevisiae	Sc948	80 µl	2.2×10^{5}
	S. pombe	CHP408	200 µl	1.4×10^{4}
	D. discoideum	KAx3	800 µl	88
	P. pastoris	X33	40 µl	1.6×10^{4}

Experiments were carried out in an ordinary laboratory and represent average efficiencies obtained using the preset programs. The efficiencies were measured per 1 µg plasmid by stable expression using auxotrophic mutants or antibiotic resistance, with the exception of *D. discoideum,* which had efficiency measured using transient expression of GFP.

References

Becker DM and Guarente L, High-efficiency transformation of yeast by electroporation, Methods Enzymol 194, 182–87 (1991)

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Howard PK et al., Establishment of a transient expression system for *Dictyostelium discoideum,* Nucleic Acids Res 16, 2613–2623 (1988)

Nickoloff JA (ed.), Electroporation protocols for microorganisms, Methods Mol Biol 47 (1995)

Prentice HL, High efficiency transformation of *Schizosaccharomyces pombe* by electroporation, Nucleic Acids Res 20, 621 (1992)

Sambrook J et al., Molecular Cloning: A Laboratory Manual, 2nd edition, Cold Spring Harbor Laboratory Press, Plainview, NY (1989)

MicroPulser System Specifications

Input voltage	In-line switching, 100–120 V or 220–240 V
Input current	2 amp RMS (100–120 V) 1 amp RMS (220–240 V)
Maximum output voltage and current	3,000 V peak into > 600 Ω Limited to 100 A peak maximum
Output waveform	Decaying or truncated exponential waveform with RC time constant of 5.0 ms assuming loads of 3.3 kΩ
Output voltage adjustment	200–3,000 V range with 10 V adjustment
Pulse-time adjustment	In manual mode, set time range is 1.0–4.0 ms with 0.1 ms precision (providing the sample-determined pulse width has time constant >4.0 ms)
Operating environment	Temperature 0–35°C Humidity 0–95% without condensation
Regulatory	EN61010 Meets EN61000-3-2 and EN61000-3-3 harmonic, flicker, and voltage fluctuation standards, FCC, Class A IEC 1010, CE
Dimensions	31 x 21 x 8 cm (L x W x H)
Weight	2.9 kg

Ordering Information

Catalog #	Description
MicroPulser Electroporator	
165-2100	MicroPulser Electroporator, universal voltage, includes chamber with leads, 10 sterile cuvettes (5 packs of 0.1 cm and 0.2 cm gap)
Cuvettes	
165-2083	MicroPulser/Gene Pulser® Cuvettes, 0.1 cm gap, 5 (mini pack)
165-2089	MicroPulser/Gene Pulser Cuvettes, 0.1 cm gap, 50 (standard pack)
165-2093	MicroPulser/Gene Pulser Cuvettes, 0.1 cm gap, 500 (jumbo pack)
165-2082	MicroPulser/Gene Pulser Cuvettes, 0.2 cm gap, 5 (mini pack)
165-2086	MicroPulser/Gene Pulser Cuvettes, 0.2 cm gap, 50 (standard pack)
165-2092	MicroPulser/Gene Pulser Cuvettes, 0.2 cm gap, 500 (jumbo pack)
165-2081	MicroPulser/Gene Pulser Cuvettes, 0.4 cm gap, 5 (mini pack)
165-2088	MicroPulser/Gene Pulser Cuvettes, 0.4 cm gap, 50 (standard pack)
165-2092	MicroPulser/Gene Pulser Cuvettes, 0.4 cm gap, 500 (jumbo pack)

Related Products and Information

Cytofectene™ Transfection Reagent

Cytofectene is a powerful, ready-to-use cationic lipid transfection reagent. Cytofectene transfection reagent provides the highest transformation efficiencies with many cell types, high transformation efficiency in the presence of serum, minimal cytotoxicity, and a simple 1-step, 1-tube transformation procedure. Cytofectene is suitable for both adherent and suspension cultures and is effective for both transient and stable expression.

XenoWorks™ System

XenoWorks is a complete line of instrumentation designed for the rigorous demands of the latest microinjection and micromanipulation techniques. The system features ergonomic height-adjustable joystick controls, micromanipulator position memories, and variable movement radius. Microinjection, whether the delivery of DNA solution to a zygote's pronucleus, or insertion of embryonic stem cells into a blastocyst, can be achieved with a level of control previously unattainable with conventional instruments.

Biolistics

Biolistic technology, or particle bombardment, is a direct physical method of delivering nucleic acids or other molecules into cells. The Helios™ gene gun and PDS-1000/He™ system provide easy-to-use, rapid, versatile gene delivery that is independent of cell type and requires small amounts of DNA and few cells. This technology can be applied in vivo or in vitro to the widest range of targets, including cell cultures, tissues, organs, plants, and animals. These instruments use a helium pulse to accelerate high-density gold or tungsten particles coated with nucleic acids directly into target cells.

Electroporation

Electroporation is a highly efficient technique for introducing nucleic acids, proteins, and other molecules into a wide variety of cells. The Gene Pulser Xcell™ is a flexible, modular electroporator system that delivers exponential or square wave pulses optimal for your cell type. With manual and "optimize" capability, an intuitive interface, and pre-set programs, the Gene Pulser Xcell provides power and reliability.

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