



Enhancer 3000[®]

MONITORING SYSTEM TECHNICAL SPECIFICATIONS

APPLICATIONS

- Optimize and Troubleshoot Electroporation Settings
- Capture and Print Results for Documentation Purposes
- Track & Download Images to Computer for Analysis

The BTX Enhancer 3000[®] offers a novel approach to monitoring critical parameters while performing electroporation applications. The system allows researchers to maintain efficiencies, optimize both electrical and biological parameters, view sample runs, troubleshoot possible problems and easily perform routine quality control. Communications using the USB data port permits storage and documentation of data for further analysis. The ENHANCER 3000[®] Monitoring System can monitor all key electroporation parameters including:

- Wave Form
- Pulse Lengths
- Peak Amplitude
- Pulse Intervals
- Field Strength
- AC duration

The electrical pulse data is captured as both a graphic display of the waveform and electrical output values following each electroporation experiment from generators w/ external pulse capability.

The ENHANCER 3000[®] System is comprised of three components:

A Voltage Probe, an Interface Box and a digital Oscilloscope. The Voltage Probe and Interface Box together comprise the voltage monitor, while the Oscilloscope displays waveform images from the actual electrical pulse. This system offers a solution for evaluating critical electroporation settings and USB for storage and input to a computer.

ORDERING INFORMATION

Order #	Product
45-0057	Enhancer 3000 [®] with Interface Box and Cables
45-0059	Enhancer 3000SC [®] with Interface Box, Oscilloscope, Communications Module and Cables, (110 V)
45-0059INTPP	Enhancer 3000SC [®] with Interface Box, Oscilloscope, Communications Module and Cables, (220 V)
45-0062	Enhancer 3000 [®] High Voltage Interface Box
45-0063	Enhancer 3000 [®] High Voltage Probe
45-0064	Oscilloscope, Tektronix TDS1002B w/o 1X/10X Low Voltage Probes
45-0066	Cable Set, Patch Cord, Banana Plug, Red/Black, 3 ft. (Consists of qty. 1 each red and black cables).

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Enhancer 3000[®] High Voltage Probe

Attenuation	1:100 / 1:1000
Bandwidth	DC to 70 MHz (-3 dB)
Accuracy	±2%
Input Impedance	10 M Ω // 10 pF each side to ground
Input Voltage:	
Differential Range	1 \pm 700 V (DC+Peak AC) or 700 Vrms @ 1/100 \pm 7000 V (DC+Peak AC) or 5000 Vrms @ 1/1000
Common Mode Range	1 \pm 7000 V (DC+Peak AC) or 2500 Vrms @ 1/100 & 1/1000
Absolute Max. Range	1 \pm 7000 V (DC+Peak AC) or 2500 Vrms @ 1/100 & 1/1000 in common mode \pm 7000 V (DC+Peak AC) or 5000 Vrms @ 1/100 & 1/1000 in differential mode

Output Voltage:

Max. Amplitude	\pm 7 V (into 50k ohm load)
Offset (typical)	< \pm 5 mV
Noise (typical)	0.9 mVrms
Source Impedance (typical)	50 Ω
CMRR (typical)	-80 dB @ 60 Hz, -50 dB @ 1 MHz
Operating Temp	10° to 40°C
Ambient Storage Temp	-30° to 70°C
Operating Humidity	25 to 85% RH
Ambient Storage Humidity	25 to 85% RH
Pollution Degree	2 (Not to be operated in conductive pollutants atmosphere)

Power Requirements:

Standard	4 AA cells or 6 VDC/200 ma mains adapter ² or regulated 9 VDC/120 ma mains adapter ²
Length of BNC Cable	88.9 cm (35 in)
Length of Input	Leads 30.48 cm (12 in)
Weight	454 g (1 lb)
Dimensions, L x W x H	20.3 x 8.3 x 3.8 cm (8 x 3.25 x 1.5 in)

Notes: 1. Voltage limit is the lesser of the DC + Peak AC and RMS values. 2. a. The supplied voltage must be less than 12 V and greater than 4.4 V, otherwise the probe could be damaged or will not operate properly. b. Polarity is "+" inside and "-" outside. For wrong polarity, a built-in circuit protects the probe; no danger or damage will occur. c. When the voltage of the batteries become too low, the power indicator will flicker.

Voltage Interface Box Specifications

Input, Output, Probe Connections:

Type	4 mm Banana Jack
Voltage	2500 Vrms, 3500 Vpk CAT II
Current (Max. Continuous)	15 A
Current (Peak)	1000 A for 100 μ s
Dimensions (L x W x H)	13.5 x 13.5 x 5.8 cm (5.3 x 5.3 x 2.3 in)

High Voltage Cable Specifications

Type	Retractable Sheath Banana Plug
Length	91.44 cm (3 ft)
Wire Gauge	18 AWG
Insulation	PVC
Voltage Rating	1000 Vrms IEC 1010-2-31, Category III
Current	10 A
Operating Temp	+55° C (+131° F) Max.

TROUBLESHOOTING

Please contact BTX Technical Support at 800-272-2775 in the event of any failure.

TECHNICAL & CUSTOMER SERVICE

For further references regarding specific applications and optimization, please contact BTX Technical Support:

BTX-Division of Harvard Apparatus
84 October Hill Road Holliston, MA 01746
Phone: 1-508-893-8999 • Toll Free: 1-800-272-2775
Fax: 1-508-429-5732
Email: techsupport.btx@harvardapparatus.com
Website: www.btxonline.com

If outside the United States or Canada: call 508-893-8999 or contact your nearest BTX Distributor.



45-0062 Interface Box



45-0063 Enhancer 3000 High Voltage Probe



45-0064 Oscilloscope
Tektronix TDS1002B
w/o 1X/10X Low Voltage Probes

BTX[®]

HARVARD APPARATUS

The Electroporation Experts

84 October Hill Road • Holliston MA, 01746

toll free 800.272.2775 • local 508.893.8999 • fax 508.429.5732

email techsupport.btx@harvardapparatus.com • web www.btxonline.com