

AVANOS

EZSTIM* III (ES500)

Peripheral Nerve Stimulator
And Nerve Locator



PERIPHERAL NERVE STIMULATION (PNS)

Where and When Is It Used?

Neuromuscular Monitoring (NMM)



ICU



OR

Peripheral Nerve Block (PNB)



Block Room/OR

NEUROMUSCULAR MONITORING (NMM)

NMM with a PNS is mandatory whenever neuromuscular blocking drugs are used¹

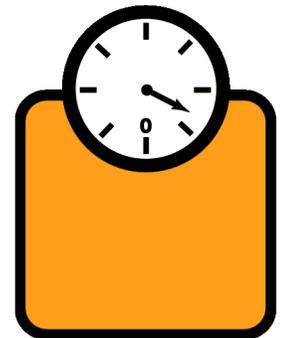
Conditions where NMM is essential...

- Patients who received large doses of NMBAs
- Those undergoing prolonged surgical procedures
- Patients at increased risk of postoperative complications from residual block

...ideally should be **monitored using objective means**.¹

ULTRASOUND: CHALLENGES FOR CONSIDERATION

- Ultrasound guidance is limited because it cannot identify the needle-nerve interface in all patients in all locations when performed by all practitioners. **Ultrasound guidance is practitioner, patient and equipment dependent.**³ Therefore a nerve stimulator may need to be used to supplement.
- Adult **Obesity** is a problem in the United States with **more than one-third** (34.9% or 78.6 million) of U.S. adults being obese.⁴ This can affect ultrasound effectiveness.
- In circumstances such as **obesity, deeper blocks, aberrant anatomy or trauma, ultrasound imaging can be limited.**³
- Relatively inexperienced clinician and even those with intermediate proficiency with ultrasound-guided RA **overestimate their ability.**³



NERVE STIMULATION IS STILL RELEVANT

Use of nerve stimulation along with ultrasound may provide an extra safety benefit.³

“Electrical nerve stimulation remains a viable and legitimate primary nerve localization alternative for nerve blocks in which ultrasound imaging is challenging or impossible.”³

– Kamen V. Vlassakov, MD
Director, Division of Regional and
Orthopedic Anesthesia
Brigham and Women’s Hospital

CHARACTERISTICS OF THE OPTIMAL DEVICE

Helping you care for your patients

FUNCTIONAL VARIETY

- Battery-operated
- Variety of stimulation patterns (e.g., Twitch, TOF, Tetanus, and DBS)

ACCURACY

- Identifies the needle-nerve interface in nearly all patient types
- Output range up to 80 mA for larger patients

DUAL FUNCTION

- One device for both NMM and PNB use
- Simplifies Biomed support/investment
- Cost-effective

SAFETY

- Compatibility with electrosurgical equipment
- Alerts when monitoring is compromised
- Limits tetanic stimulation duration
- No cross contamination

USER-FRIENDLY FEATURES & ACCESSORIES

- Intuitive LCD display and controls
- Glove-friendly adjustment dial
- No need to calibrate before use
- Error messaging
- Audible indicators of open circuit
- Mounting bracket

ΔVANOS STIMULATOR HISTORY

Nearly 40 years of innovation & design firsts

1962 – First commercially available stimulator for anesthesia

1968 – First stimulator with Train of Four NS-2A

1984 – First dual function stimulator

1996 – First EZstim*

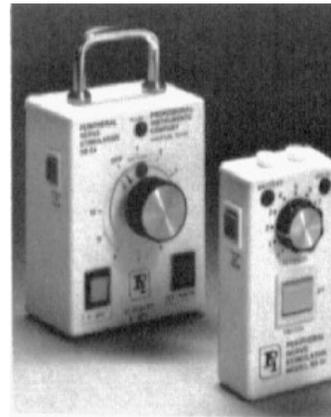
2004 – First Stimulator to offer:

- ESI compatibility
- Lead set controlled output
- Audible indication for low output current levels

2016 – Improved design & features



1962



1968



1984



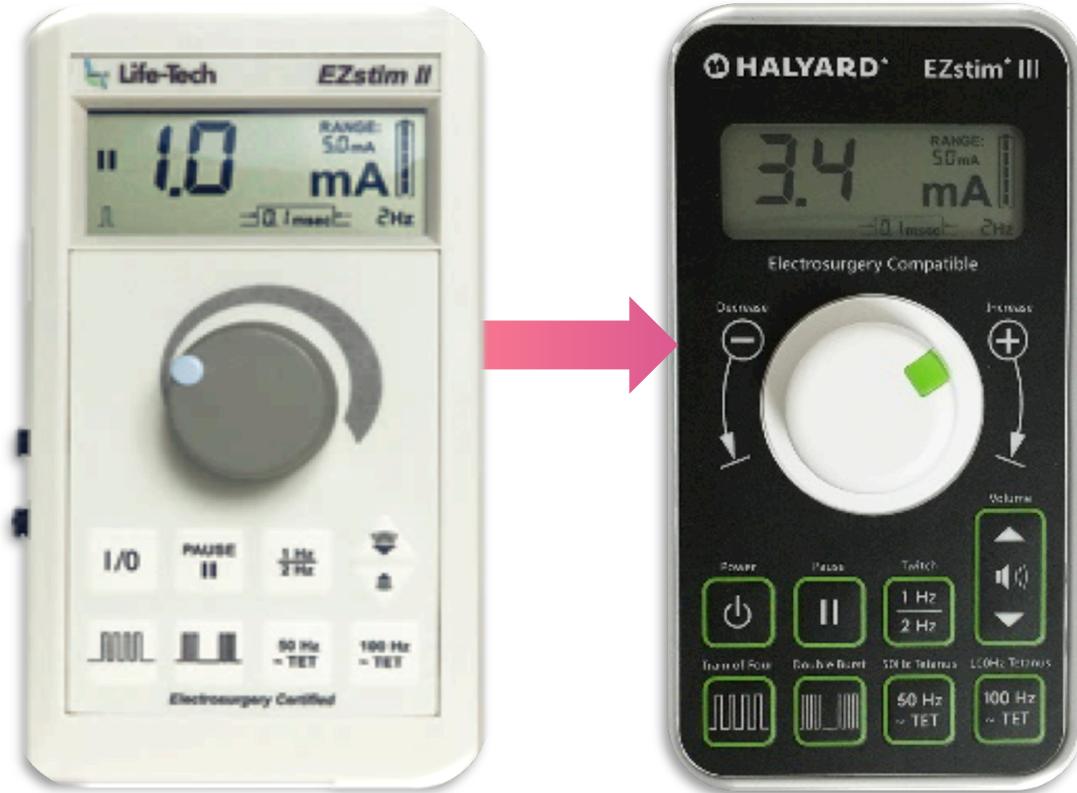
2004



2016

EZSTIM* II (ES400) VS. EZSTIM* III (ES500)

Thoughtful Enhancements



EZstim* II
(ES400)

EZstim* III
(ES500)

- Audible open circuit or high resistance indicator
- Error message indicators to facilitate troubleshooting
- Protective, silicone edge (no more need for sleeve)
- Rubber battery compartment seal (IP21 Rated)

IP21 = Protected against solid foreign objects of 12.5 mm diameter and greater. Protected against vertically falling water drops.

COMPETITIVE LANDSCAPE OF PERIPHERAL NERVE STIMULATORS

	DUAL FUNCTION (NMM+PNB)		SINGLE FUNCTION (NMM)			SINGLE FUNCTION (PNB)				
	Avanos*	Xavant/Arrow®	Avanos*	SunMed		Pajunk®			B. Braun	Temena Group
	EZstim* III (ES500)	Stimpod NMS 450	MiniStim* (MS-IVB)	SunStim™	SunStim™ Plus	MultiStim SENSOR	MultiStim SWITCH	MultiStim ECO	Stimuplex® HNS 12	Polystim II
OUTPUT RANGE (mA)										
Low	0.05-5.0 ± 3%	0-5.0 ± 5%	N/A	N/A	N/A	0-6.0	0-6.0	0.20-2.0	0-5.0 ± 0.02	0-5.0
High	0.05-80 ± 5%	0-80 ± 5%	0-50	0-70	0-70	N/A	N/A	N/A	N/A	N/A
FUNCTIONS										
1 Hz	•	•	•	•	•	•	•	•	•	•
2 Hz	•	•				•	•		•	•
Train of Four	•	•	•	•	•					
Double Burst	•	•	•		•					
Tetanus 50 Hz	•	•	•		•					
Tetanus 100 Hz	•	•	•	•	•					
Pause	•	•		•		•	•			
FEATURES										
Power Supply	9V	4 x AAA	9V	9V	9V	9V	9V	2 x 1.5V N	9V	9V
Warranty	2-Year	2-Year	2-Year	1-Year	1-Year	Information Unavailable	None	Information Unavailable	2-Year	2-Year
Electrosurgery Compatible	•		•							
Disconnect/High R Monitor/Open Circuit	•	•	•			Information Unavailable	•	Information Unavailable	•	

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ELECTROSURGERY COMPATIBILITY—GREATER PATIENT SAFETY

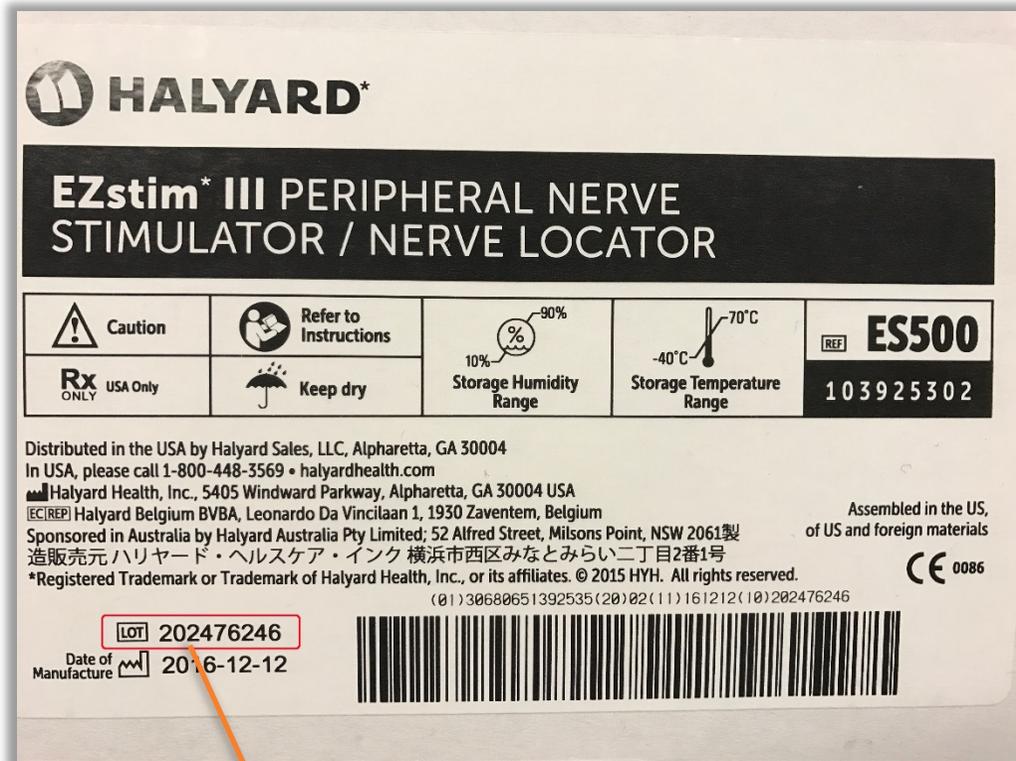
Only Ezstim* III and MiniStim* have it!

- Electrosurgery has been described as high-frequency electrical current passed through tissue to create a desired clinical effect.⁵
- EZstim* III and MiniStim* MS-IVB unit circuitry are shielded so that current from high frequency surgical equipment (e.g., Bovie) doesn't activate the stimulator.
 - Minimize interruptions of patient care or neuromuscular monitoring
- If the unit was not shielded, it may couple with the high frequency surgical equipment and initiate Tetanus.
 - Potentially causing burns where the leads are connected to the patient.
- Competitive products must first be turned off/disconnected from the leads during electrosurgery.
 - Otherwise they may risk patient safety and incur liability.

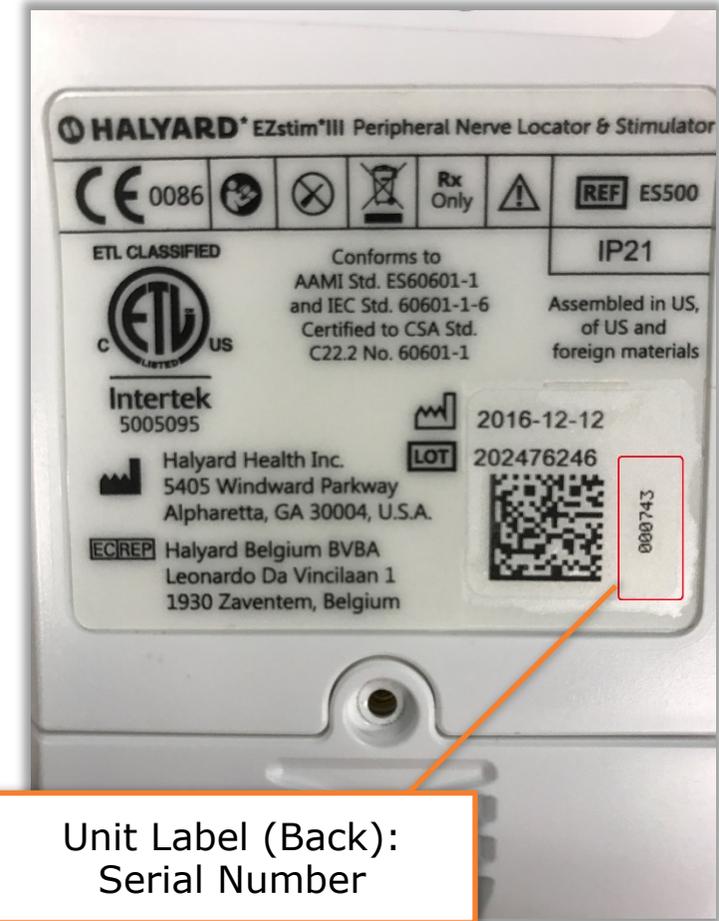
EZSTIM* III SUPPORT

EZSTIM* III (ES500)

Free Replacements with 2-Year Warranty



Package Label:
Lot Number



Unit Label (Back):
Serial Number

MULTIDIMENSIONAL SUPPORT

EXPERT IMPLEMENTATION ASSISTANCE



Over 10 years of experience working with leading institutions to develop **successful regional anesthesia programs**

ONGOING TRAINING



For anesthesiologists and multidisciplinary teams to stay current with techniques and **keep workflow efficient**

ROUND-THE-CLOCK RESPONSIVENESS



With clinician-staffed **24/7 hotline** for both patients and nurses—provides reassurance while reducing burden on the physician

EXTENSIVE LOCAL SUPPORT



From coordinated ON-Q* representatives and clinical experts to ensure **uninterrupted personalized coverage** and continuing success

THANK YOU!

REFERENCES

1. Brull, S.J., Kopman, A.F. "Current Status of Neuromuscular Reversal and Monitoring: Challenges and Opportunities." *Anesthesiology*. 2017 Jan;126(1):173-190.
2. McGrath, Conor D., Hunter, Jennifer M. "Monitoring of Neuromuscular Block." *Continuing Education in Anaesthesia, Critical Care & Pain*. 2006; Volume 6, No. 1.
3. Regional Anesthesia Roundtable: Expert Panel Answers 10 Questions. *Anesthesiology News*. March 2016.
4. Ogden, Cynthia et al. Prevalence of Childhood and Adult Obesity in the United States, 2011-2012. *JAMA*. 2014;311(8):806-814.
5. Masserwah, Nader N, et. al. "Electrosurgery: History, Principles, and Current and Future Uses." *Journal of the American College of Surgeons*. Vol. 202, No. 3, March 2006.

ΔVANOS

For more information please visit
avanospainmanagement.com

1-800-448-3569
1-844-4AVANOS (1-844-428-2667)

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APPENDIX

EZSTIM*III (ES500) DUAL-FUNCTION COMPETITION: TRADE-OFFS

Xanant/Arrow® Stimpod NMS450



- From IFU: “Do not use the STIMPOD in close proximity to equipment that produces strong electromagnetic fields, such as high frequency surgical equipment. The cable leads could act as antennae and dangerous currents could be induced as a result.”
- Multifunction switch—press until function displays
 - Default function is Train of Four
- Press to activate selection
- Pressure sensitive current adjustment and menu wheel
- Menu must be set in advance for repeat modes
- Thumb ring is reusable—potential cross contamination risk

Requires BA-03 Adaptor
for use with Avanos
Needles



EZSTIM*III (ES500) SINGLE-FUNCTION COMPETITION: TRADE-OFFS

B. Braun Stimuplex® HNS 12



B. Braun
Stimuplex® HNS 12

- Single function for PNB only
- No pause function
- Facility must purchase 2 different stimulators if need coverage for NMM usage
- More expensive to maintain
- Requires additional product knowledge/support

EZSTIM* III (ES500)

Contents & Accessories

PACKAGE CONTENTS:

- ES500 Unit
- IFU
- NSL-5 (High Current Lead Wire Set)
- RBW-5U (Low Current Lead Wire Set)
- 9V Battery



NSL-5V



RBW-5U

ACCESSORIES:

- Mounting Bracket (MB500)
- Repair Kit (RK500)
- NSL-5 (High Current Lead Wire Set)
- RBW-5U (Low Current Lead Wire Set)*



*RBW-5L/BB also available

EZSTIM* III FUNCTIONAL OVERVIEW

User Friendly Controls

1. Output Current Control Knob
2. Knob Position Indicator
3. Power Button
4. Pause Button
5. Twitch Selection Button
6. Volume Control
7. Train of Four Button
8. Double Burst Stimulation Button
9. 50 Hz Tetanus Button
10. 100 Hz Tetanus Button

