

# The Streamlined Somatics Thymatron<sup>®</sup> System Saves Time and Effort



*You Need a Thymatron<sup>®</sup> System IV to provide higher stimulus current, deeper cerebral stimulus penetration, and better seizure generalization.*

*You Need a Thymatron<sup>®</sup> System IV to provide the most effective form of bilateral brief pulse ECT with a 0.5 msec pulsewidth that minimizes side-effects and can be delivered at every stimulus dose including the maximum dose.*

*You Need a Thymatron<sup>®</sup> System IV for efficient and accurate stimulus titration.*

***“THYMATRON<sup>®</sup> Why Trust Anything Less?”***



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Cat. #EDIV

## The Thymatron® System IV: Description and Specifications

- ULTRABRIEF STIMULI** Ultrabrief stimuli need higher current for greater efficacy. If you still use the 800 mA maximum current of Mecta devices, to assure full efficacy you should upgrade to the 900 mA provided by Thymatron® instruments. Further, the Thymatron® System IV is the only instrument that delivers a 0.3 msec ultrabrief stimulus across the entire dosage range, 25% more than the Mecta.
  - EASIEST SEIZURE INDUCTION WITH THE THYMATRON SYSTEM IV** Thymatron® stimuli are 60% more effective for inducing seizures than the 800 mA Mecta stimuli (Chanpattana et al., 2001). This enormous difference results from the much higher stimulus dose of Thymatron® 900 mA current than 800 mA, yielding a larger volume of seizure foci in the brain (Swartz, 2006). This provides clinicians with a dose advantage in treating high-threshold geriatric patients. With the new age-adjusted titration method for Thymatron® instruments seizure threshold titration is easier, more precise, and requires fewer stimulations.
  - 25% FEWER ECTS WITH AGE-BASED DOSING THAN TITRATION** Age-based dosing required 25% fewer ECTs for the same improvement in depression scores in a recent prospective study of 79 patients (Aten et al 2015) treated with a Thymatron® instrument. The investigators were surprised to find "the importance of age...possibly exceeding...an individualized approach to seizure threshold." For age based dosing the %Energy Dial was set to patient age for unilateral ECT and half-age for bilateral ECT as per Petrides et al(1996). Age-based dosing at any pulsewidth can be consistently accomplished only with a Thymatron® instrument. Others require increasing pulsewidth to increase dose in the higher ranges, impairing clinical results and provoking more cognitive side-effects.
  - STATE-OF-THE-ART 4-CHANNEL PRINTER STANDARD ON ALL UNITS** allows you to monitor two channels of EEG, plus ECG and EMG (or, choose 4 channels of EEG), while providing *hard-copy* documentation for later reference.
  - SINGLE FRONT-PANEL DIAL** lets you select the traditional Thymatron® functions plus important new ones, including *Optimal Stimulus* programs that automatically set the most efficient combination of stimulus parameters at every stimulus dose setting.
  - ELECTRONIC MEDICAL RECORD-KEEPING** is simple with the included Genie™ IV EMR software. Patient treatment records created and stored with the Genie™ IV are easily incorporated into hospital database systems.
  - EXTENDED LOWER STIMULUS RANGE** with pulsewidth and frequency to 0.25 or 0.3 msec and 10 Hz allows you to deliver *stimuli up to 8 seconds long*, to optimize treatment in accordance with research showing greater efficacy of short-pulsewidth, extended-duration stimuli (Isenberg et al, 1996).
  - EEG COHERENCE MEASURES** of *maximum sustained coherence*, and *time to peak coherence*, interhemispheric cross-correlation measures reported to reflect seizure quality and clinical impact (Krystal & Weiner, 1994; Krystal et al, 1995; Krystal, 1998).
  - EEG AMPLITUDE** measures of *maximum sustained EEG power*, and *average seizure energy*, with separate values for *early*, *mid*- and *postictal seizure phases*, found by the Duke University group to be important correlates of seizure quality and efficacy ( Krystal & Weiner, 1994; Krystal et al, 1995; Krystal, 1998).
  - HEART RATE MEASURES**, including *peak heart rate*, a key measure of cerebral seizure duration and quality (Larson, Swartz & Abrams, 1984; Swartz, 1993; 1996; Swartz and Manly, 2000) that reflects the autonomic (brainstem) response to ECT. This is supplemented by *continuous digital heart rate monitoring* for safety and seizure generalization, with the result printed each second.
- All of the above measures are automatically printed.*
- A POWERFUL 32-BIT INTERNAL COMPUTER** employs *Power Spectral Analysis* to process and store up to 10 minutes of digitized EEG for the special features described here. You can send this data to your IBM PC-compatible computer via a rear-panel serial port for further comprehensive EEG analysis, using Somatics' proprietary Genie™ IV software.

- Because each ECT treatment session is **STORED IN MEMORY**, you can retrieve it if you run out of paper during a treatment—just slip in another pad after the treatment and *press a button for a complete printout*.
- **PATENTED INDEPENDENT SAFETY MONITOR CIRCUIT** prevents the patient from receiving an excessive electrical dose regardless of the operation of the regular circuits.
- **TRUE EMG RECORDING OF THE MOTOR SEIZURE.** Unlike simple movement detectors, the Thymatron® System IV's EMG can measure seizure muscle activity that is not visible to the naked eye, and which typically continues substantially longer than optically-detectable movements (Couture et al, 1988).
- Because the special computer-automated programs of the Thymatron® System IV are stored on **REPLACEABLE MICROCHIPS**, updates are easily accomplished on-site via chip replacement. Somatics has already provided 4 advanced microchip upgrades for the System IV including: the ultrabrief 0.25 msec pulsewidth program, Genie™ IV computer software, real-time digital EEG monitoring. In comparison, any upgrades to the Mecta spectrum (there have been none) would have required return to the factory.
- The **POSTICTAL SUPPRESSION INDEX** reports the degree of EEG flattening immediately following the seizure, which correlates with clinical efficacy (Nobler et al, 1993; Krystal & Weiner, 1994; Krystal et al, 1995; Krystal, 1998; Nobler et al, 2000). A recent study of the Thymatron®'s *Postictal Suppression Index* found that it significantly differentiated ECT remitters from non-remitters (Petrides et al, 2000). The authors concluded: *"higher PSI values (more abrupt ending of ictal EEG) are correlated with better clinical outcome of ECT in depression"*.
- **COMPUTER DETERMINATION AND PRINTOUT OF EEG AND MOTOR SEIZURE DURATIONS.** The integral computer EEG analyzer continually measures the EEG and EMG and automatically prints the EEG and motor seizure durations with precision and reliability (Swartz et al, 1994; Krystal et al, 1995).
- **JUST SET ACCORDING TO AGE AND TREAT.** Setting the Thymatron® System IV according to the patient's age facilitates easy selection of the stimulus charge.
- **Alternatively, RAPID STIMULUS TITRATION** is facilitated with the Thymatron® System IV using a simple method-of-limits procedure (McCall et al, 1993; Rasmussen et al, 1994) that employs research based dose increments: 5, 10, 15, 25, 40, 80, and 100% Energy at your choice of pulsewidth.

(see next page for references)

## THYMATRON® SYSTEM IV FEATURES CHECKLIST<sup>1</sup>

	Thymatron® System IV	Mecta Spectrum
Choose 0.25 or 0.3 msec Ultrabrief Pulsewidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Genie™ IV Software	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Four-Channel Monitor/Printer	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Optimal Stimulus Programs	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Maximum Sustained EEG Amplitude	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Continuous Digital Heart Rate Monitor	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Peak Heart Rate Printout	<input checked="" type="checkbox"/>	<input type="checkbox"/>
EEG Coherence Analysis	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Seizure Energy Index	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Postictal Suppression Index	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Maximum Dose Available at all Pulsewidths	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Interictal Frontal Delta Analysis	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Computer EEG Seizure Duration	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Computer Motor Seizure Duration	<input checked="" type="checkbox"/>	<input type="checkbox"/>
True EMG Monitor	<input checked="" type="checkbox"/>	<input type="checkbox"/>
EEG Ictal Line Seizure Indicator	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Light-Emitting Elapsed Time Display	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Up to 8 Seconds of Stimulation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Change Waveform without Altering Dose	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Audible EEG™ monitor	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Instant Impedance Test	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Extended Seizure Alert	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Patented Safety Monitor Circuit	<input checked="" type="checkbox"/>	<input type="checkbox"/>

***"Thymatron® Why Trust Anything Less?"***

<sup>1</sup>U.S. patents 5269302, 5470347, 5871517, 6039046, 6200331

## SPECIFICATIONS

**STIMULUS OUTPUT:** Current: 0.9 amp constant, limited to 450 volts, isolated from line current.

Frequency: 10 to 70 Hz in 10 Hz increments (to 140 Hz for 0.25 msec pulse).

Pulsewidth: 0.25 or 0.3 msec (choose one) and 0.5 - 1.5 msec in 0.25 msec increments.

Duration: 0.14 to 8.0 sec in increments of equal charge.

Maximum output: Standard maximum output is typically 504 mC current with 99.8 joules energy across 220 ohms impedance. Output for double dose modes (where available) is typically 1008 mC current with 199.6 joules energy across 220 ohms.

**RECORDING:** 8 user-selectable gain positions: 10, 20, 50, 100, 200, 500, and 2000 µV/cm.

**REQUIREMENTS:** 100-130 volts (120 volts) A.C., 60 Hz, single phase. 100 VA. /220-240 volt, 50/60 Hz switchable.

**APPROVALS:** CSA, CE, ISO 13485:2003, IEC 60601



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#EEDS

## SOMATICS' OWN DISPOSABLE SELF-STICK EEG/ECG/EMG ELECTRODES

Easy and quick to use, "the pregelled electrodes provided in the Thymatron DG starter kit. . . reduce preparation time" (*Convulsive Therapy* 2:53, 1986), compared to metal electrodes and ordinary disposable paper ECG electrodes. Their small size facilitates bifrontal or fronto-mastoid application without interfering with treatment electrode placement. Ideal for recording EEG, ECG, and EMG, they are conveniently packaged 5 per strip. Instantly adherent, they will remain in place throughout the seizure.

## Free Guide to ECT Electronic Book

Somatics is pleased to provide individual psychiatrists and psychiatric residents with a free copy of the concise "Guide to Electroconvulsive Therapy" by Conrad Swartz, Ph.D., M.D., updated yearly. This e-book contains the basic clinical information for psychiatrists to know how to give ECT (but of course clinical experience is also needed).

Dr. Swartz recommends this book for psychiatrists interested in the latest ECT methods, as well as those learning about ECT, including psychiatry residents. This book is in printable electronic PDF format and is available solely by individual registration. Any other distribution is not authorized.

Somatics is now making individual copies available gratis. Simply send an email to [edu@thymatron.com](mailto:edu@thymatron.com) requesting a PDF copy of "Guide to ECT."



## NEW REMOTE TREAT HANDLE FOR THYMATRON®

You asked for a remote treat handle and here it is. You can press the TREAT button on this handle instead of reaching over to the Thymatron® itself: a simple thumb press safely triggers the stimulus for any electrode placement, including unilateral.

# A ONE-PAGE COURSE IN ADVANCED ELECTROCONVULSIVE THERAPY

% Energy set ..... 45%  
 % Energy delivered ..... 45%  
 Charge delivered..... 308 mC  
 Current ..... 0.90 A  
 Stimulus Duration ..... 7.2 sec  
 Frequency ..... 70 Hz  
 Pulse Width ..... 0.3 msec  
 Static Impedance..... 1440 ohms  
 Dynamic Impedance..... 260 ohms  
 EEG Seizure Endpoint ..... 48 sec  
 EMG Endpoint..... 45 sec

Peak Heart Rate ..... 128/min  
 Average Seizure Energy Index..... 72 V<sup>2</sup>  
 Postictal Suppression Index..... 96%  
 Maximum Sustained Power..... 77841  $\mu$ V<sup>2</sup>  
 Time to Peak Amplitude ..... 33 sec  
 Maximum Sustained Coherence ..... 95%  
 Time to Peak Coherence..... 33 sec

This sample ECT report of the Thymatron® System IV shows that the doctor set the % Energy dial to his patient's age of 45 years, yielding a 308 mC stimulus charge. The *Optimal Stimulus Program* selected a 0.3 msec pulsewidth, 70 Hz frequency stimulus delivered over 7.2 sec. Prior to stimulus administration the impedance measured a safe 1440 ohms, which dropped to 260 ohms during stimulus delivery.

The EEG seizure lasted 48 seconds. Peak seizure amplitude was reached at 31 sec, with a mid-ictal amplitude of 264  $\mu$ V, a *Maximum Sustained Power* of 77841  $\mu$ V<sup>2</sup>, and an *Average Seizure Energy Index* of 72 V<sup>2</sup> reflecting strong seizure intensity.

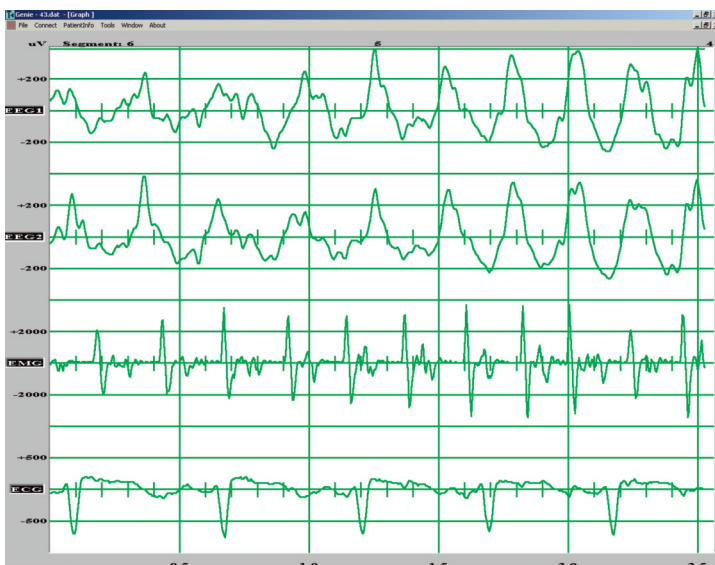
*Peak Interhemispheric Coherence* reached at 33 sec was consistent with the seizure amplitude peak at 31 sec. The *Maximum Sustained Coherence* value of 95% reflected synchronous participation of both hemispheres in the seizure. The rapid drop of EEG seizure amplitude to 10  $\mu$ V postictally yielded a high *Postictal Suppression Index* of 96%. Power Spectral Analysis was not enabled.

*In summary, the record shows a synchronous, high-intensity, well-developed, and well-generalized EEG seizure pattern with a strong midictal phase, pronounced postictal suppression, and a substantial tachycardia response—which is to say, an ECT-induced seizure of high expected clinical efficacy (Abrams, 2002)*

## GENIE™ IV ELECTRONIC PATIENT DATABASE AND EEG MONITORING SYSTEM

Designed to meet your clinical and research needs, the Genie™ IV enables you to enter complete patient information at each treatment for storing, printing or incorporating into a hospital-based electronic patient database system.

Equally important is the Genie™ IV's comprehensive real-time display of up to 4 channels of EEG, ECG, and EMG on a PC screen (not included), allowing you to monitor and then store each treatment session.

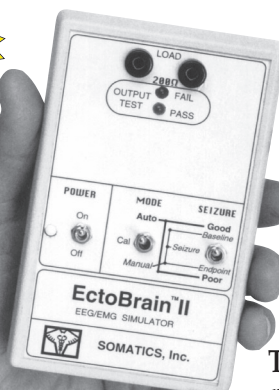


### (GENIE™ IV Patient Information Data File/Printout)

Date: 12-16-05    Name: Laurenz Smarba    Age: 58    Sex: M  
 Somewhat improved but still has insomnia & poor appetite  
 Oriented, alert, coherent and cooperative  
 ECT #3 (R-UNI x 1)    Anesthesia: Dr. Jones    ECT: Dr. Smith  
 Atropine 0.2 mg - Brevital 50 mg - Succinylcholine 40 mg  
 Thymatron IV    85% Energy    (LOW 0.5 program)  
 Moderately strong seizure-symmetrical, well developed  
 Good heart rate response with rapid return to baseline  
 No complications, quick recovery  
 Recommendation for ECT #4: same as above

# DOES YOUR ECT DEVICE DELIVER THE DOSE YOU SPECIFY? DO YOU TRAIN DOCTORS OR NURSES IN ECT QUALITY?

U.S. PAT.  
#6,200,331



Device malfunction can cause ineffective ECT treatments or excessive side-effects. Now you can check your ECT device yourself with Somatics' easy-to-use, patented ECTOBRAIN™ II, which performs the same current output check professional engineers use. A single button press instantly tells you if your ECT device is operating safely— providing reassurance and peace of mind. ECTOBRAIN™ II works with any Thymatron®.

ECTOBRAIN™ II also features a *Patient Simulator* mode that generates EEG, ECG, and EMG signals derived from real patients for testing up to 4 channels of your monitor/printer tracing display and for training and demonstration purposes. Both good- and poor-quality seizures can be selected.

The good-quality seizure shows a high amplitude EEG followed by electrical silence at termination, with a pronounced tachycardia response and a high-amplitude EMG that terminates shortly before EEG termination. The poor-quality recording exhibits a low-amplitude abortive-type EEG seizure lasting only 10 sec, followed by continued but lower-amplitude EEG

fluctuations after termination; there is no tachycardia response, and an initial low-amplitude EMG response lasts only a few seconds.

A device checkup can cost \$600 to \$800 but real costs are more. How often does the question arise in treating a difficult patient whether the ECT device is stimulating properly or the EEG tracing recording correctly? *Most ECT units sent to us for presumed malfunction have nothing wrong with them!* ECTOBRAIN™ II can quickly determine whether or not the device is working. It can reveal problems in technique (e.g., recording electrode application) that are correctable on site or with user-replaceable parts (e.g., lead wires). Just connect the stimulus and recording cables and press the TREAT button as for a patient.

The chart recorder of your ECT device will display samples of EEG, ECG, and EMG tracings as described above. The printed report will show the values of the stimulus parameters and other printed variables of your ECT device, including the *measured stimulus charge output* in mC.

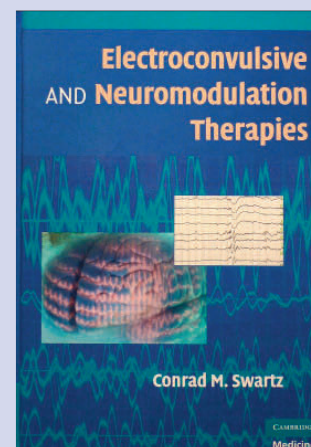
Satisfaction guaranteed by Somatics' 30-day unconditional full-satisfaction trial period. 5-year warranty on parts *and* labor.  
*Special price when ordered together with a Thymatron® System IV.*

## Trouble-Shooting with the ECTOBRAIN™ II

**Problem**      **How to test using Ectobrain™ II \***

No Stimulus output	Section I
Impedance test error	Section II
ECT stimulus cable failure	Section III
No EEG, EMG endpoint	Section IV
ECG channel doesn't print	Section IV
No Ictal Line	Section IV
Special feature doesn't print	Section IV
EEG amplifiers require calibration	Section VI
ECT stimulus requires calibration	Section VI

\* See specified sections of Ectobrain™ II manual on [www.thymatron.com](http://www.thymatron.com) downloads page



This ground-breaking new text edited by internationally-recognized ECT expert Dr. Conrad M. Swartz comprehensively covers the scientific basis and clinical practice of ECT as well as the latest nonconvulsive electrical and magnetic brain stimulation therapies. The many expert contributors from around the world illustrate compellingly that ECT is now a mainstream psychiatric treatment. The wealth of new and surprising information it contains is certain to provide ECT practitioners with much enjoyable "brain stimulation".

*Call David Mirkovich at 1(800)642-6761 for our very attractive price.*



# THYMATRON<sup>®</sup> MORE EFFECTIVE THAN OTHER DEVICE STUDY RESULTS CONFIRM

In clinically similar studies of ECT efficacy in Major Depression remission was achieved in 87% with the Thymatron<sup>®</sup> ECT instrument (CORE Study Group, Petrides et al, 2001) compared with 54% with another machine (Columbia Group, Tew et al, 1999). Fully 60% more patients achieved remission with the Thymatron<sup>®</sup> and ECT sessions per patient averaged 60% fewer, necessarily yielding shorter hospital stays. Greater antidepressant efficacy of the Thymatron<sup>®</sup> reflects the fact that its 900 mA stimulus has 142% more seizure-inducing potency millicoulomb for millicoulomb and a more efficient pulse at high doses. *Don't your patients deserve better and faster results?*

## SOMATICS THYMATRON<sup>®</sup> INSTRUMENTS IMPORTANT RESEARCH TOOLS

Since the Thymatron<sup>®</sup> was first introduced in 1983 hundreds of research studies have appeared in the medical literature using a Thymatron<sup>®</sup> instrument. Prominent among these is the series of publications by the multi-hospital CORE research group, a consortium of academic psychiatric centers.

In a series of important articles over the last decade the CORE group used Thymatron<sup>®</sup> ECT instruments to demonstrate the striking efficacy of ECT in the treatment of psychotic depression (Petrides et al, 2001), to determine that age had a strong positive association with the response to bilateral ECT (O'Connor et al, 2001), to show that DSM III melancholic features are unreliable predictors of ECT response (Fink et al, 2007), to find that unipolar and bipolar depressives respond equally well to ECT (Bailine et al, 2010), and to report that, although fewer black than white depressed patients received ECT, there was no overall racial difference in treatment response (Williams et al, 2008).

Hundreds of other studies used a Thymatron<sup>®</sup> instrument to demonstrate, among other things, that:

ECT given twice a week was equally effective as three times a week, but with fewer cognitive side-effects (Lerer et al, 1995).

Antidepressant potency of high-dose right unilateral ECT was equal to bilateral ECT (Abrams et al, 1991).

Caffeine lengthened seizure duration but did not change the convulsive threshold (McCall et al, 1993).

Bilateral ECT did not yield any evidence for brain damage as measured by levels of neuron-specific enolase and S-100 protein (Agelink et al, 2001).

ECT was nearly four times more effective than transcranial magnetic stimulation (TMS) for major depression (Eranti et al, 2007).

None of 7 patients with intracranial masses were neurologically adversely affected by ECT (Rasmussen et al, 2007).

In 28 severely depressed patients given a course of unilateral ECT, only responders showed elevations of N-acetylaspartate, suggesting that ECT exhibits positive neurotrophic effects (Michael et al, 2003).

In 32 consecutive patients seizure durations automatically reported by the Thymatron instrument correlated highly with determinations made by trained physicians (Rosenquist et al, 1998).

### REFERENCES

Abrams R et al (1991) Arch Gen Psych 48:746; Agelink MW et al (2001) J Neurol Neurosurg Psych 71:394; Aten et al (2015) Eur Arch Psych Clin Neuro 265:351; Bailine S et al (2010) Acta Psychiatr Scand 121:431; Eranti S et al (2007) Am J Psych 164:73; Fink M et al (2007) JECT 23:139; Lerer B et al (1995) Am J Psych 152:564; McCall WV et al (1993) Am J Psych 150:1543; Michael N et al (2003) Neuropsychopharm 28:270; O'Connor MK et al (2001) Am J Ger Psych 9:382; Petrides G et al (2001) JECT 17:244; Rasmussen KG (2007) J Neuropsych Clin Neurosci 19:191; Rosenquist PB et al (1998) JECT 14:76; Tew et al (1999) Am J Psych 156:1865; Williams MD et al (2008) JECT 24:117

### Thymatron Others

2015	183	137
2014	572	369
2013	246	149
2012	302	179
2011	355	222
2010	416	255

This yield of articles from a 6-year Google Scholar search on the terms *electroconvulsive+year+device* demonstrates that the Somatics Thymatron<sup>®</sup> is the ECT instrument most preferred by ECT scholars and experts over all other ECT devices. It clearly gets results.

**The Choice is Easy (and Smart!)**  
**Thymatron<sup>®</sup> Why Trust Anything Less?**



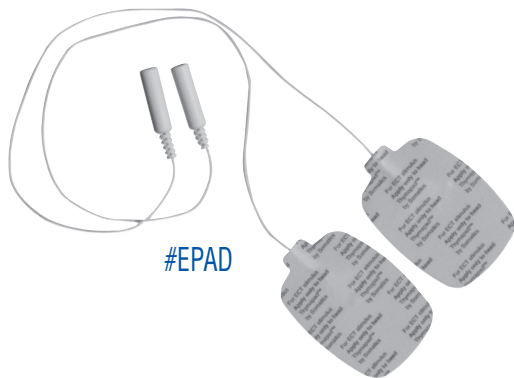
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PRESORTED  
STANDARD  
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PALATINE, IL

***“Thymatron® System IV: The most advanced ECT device technically and operationally, with demonstrated superior safety and clinical effectiveness.”***

## SAFE, TIME-SAVING DISPOSABLES FOR ECT



### THYMAPAD™ Adherent Stimulus Electrodes

*Thymapads™* are much faster and easier to use than the old-fashioned disk, headstrap, and jelly method.

They remain exactly where applied and have no exposed metal surfaces to cause accidental shocks. There's no mess to clean up afterwards, nothing to wash, dry, or sterilize, no sticky hands - just remove them and discard.

*Thymapads™* flexibly conform to the surface of the head and fit all Mecta machines too.

The *Ventil-A™*'s thick 100% closed-cell foam construction protects all the teeth. Fits easily under any anesthesia mask and features a non-collapsible air channel for free flow oxygen. One-piece design for dimensional stability and looped end for fast and easy insertion/removal. One size fits >98% of adults.

Both of these single-use ECT aids (US Patent 6039046) save the time and expense of washing and sterilization and eliminate the risk of cross-infection that occurs with re-usable products.

### VENTIL-A™ Mouth Protector



#VENT

OVER  
1,000,000 SOLD