

Transcranial Magnetic Stimulator

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About TMS

TMS is a painless and non-invasive neuromodulation technique. It directs a magnetic pulse through the intact skull to stimulate the underlying brain tissue. The magnetic pulse that induces a current flow that activates neurons close to the surface, either facilitating or inhibiting their function depending on the protocol.

In 2002 and 2008 respectively, TMS was approved by Health Canada and the U.S. Food and Drug Administration (FDA) for treating treatment-refractory depression. In addition, New Zealand, Israel, and other many countries also have recognized that repetitive Transcranial Magnetic Stimulation (rTMS) can be used for treatment-refractory depression. The growth of the academic literature on rTMS has increased by over 20%, indicating a prominent role for rTMS in basic science and clinical practice.

Application Field

TMS is a painless and non-invasive neuromodulation technique which can modulate neurotransmission, cerebral blood flow, and neurotrophic factors. Brain plasticity is achieved via low or high frequency stimulation, inducing long term potentiation (LTP) and long term depression (LTD) as needed. The rTMS technique is widely used in many fields:

Neurology and Rehabilitation

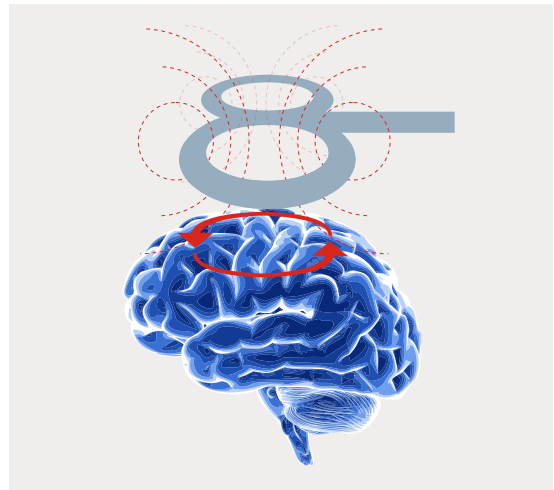
Pain, Parkinson's, Alzheimer's, motor neuron disease, multiple sclerosis, cerebral apoplexy, urinary retention, urinary incontinence, spinal injury, peripheral nerve injury, resuscitation coma, child autism, child cerebral palsy, hyperactivity, and more.

Psychiatry

Depression, anxiety, schizophrenia, post-traumatic stress disorder (PTSD), obsessive-compulsive disorder, sleep disorders, and more.

Other Fields

Cognitive neuroscience, athletic rehabilitation research, addiction, and more.



YINGCHI-TMS Model and Configuration

Model	Frequency (Adjustable)	Cooling technology	Standard	Optional parts
M-100 ultimate	0-100Hz	<ul style="list-style-type: none"> Intelligent liquid-cooling system Liquid cooled coil Air cooled coil Passive cooled coil 	<ul style="list-style-type: none"> Generator Cart Coil holder Double coil Circular coil Positioning cap 	<ul style="list-style-type: none"> Robotic arm Optical neuronavigator Liquid-cooling circulation system Pair Pulses TMS system ERP MEP module PC control system Adjustable treatment chair Kinds of coils
M-50 ultimate	0-50Hz			
M-30 ultimate	0-30Hz			
M-10 ultimate	0-10Hz			

Products Instruction



07



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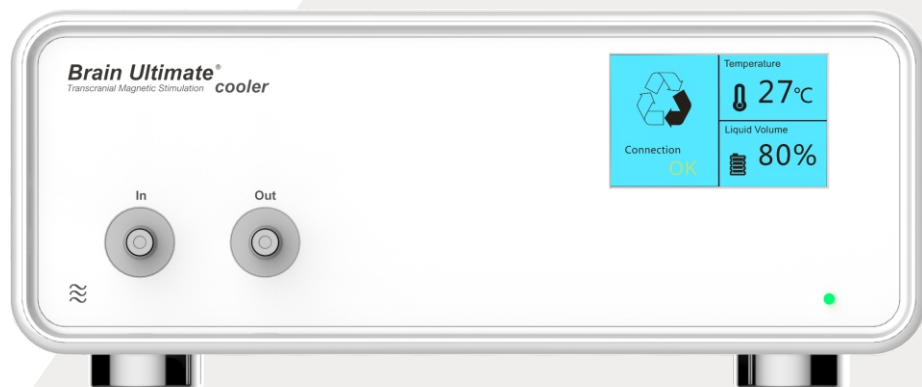
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- 01 TMS stimulation generator: LCD control panel, export data to USB
- 02 Sub-stimulator of ppTMS
- 03 Intelligent liquid-cooling circulation system
- 04 Robotic arm: track the head movement automatically
- 05 Multi-dimensional adjustable treatment chair
- 06 MR based neuronavigator
- 07 Wireless dual channels MEP module
- 08 Brain Products EEG amplifier
- 09 EB Neuro EEG amplifier

Intelligent Liquid-cooling Circulation System

System composition:

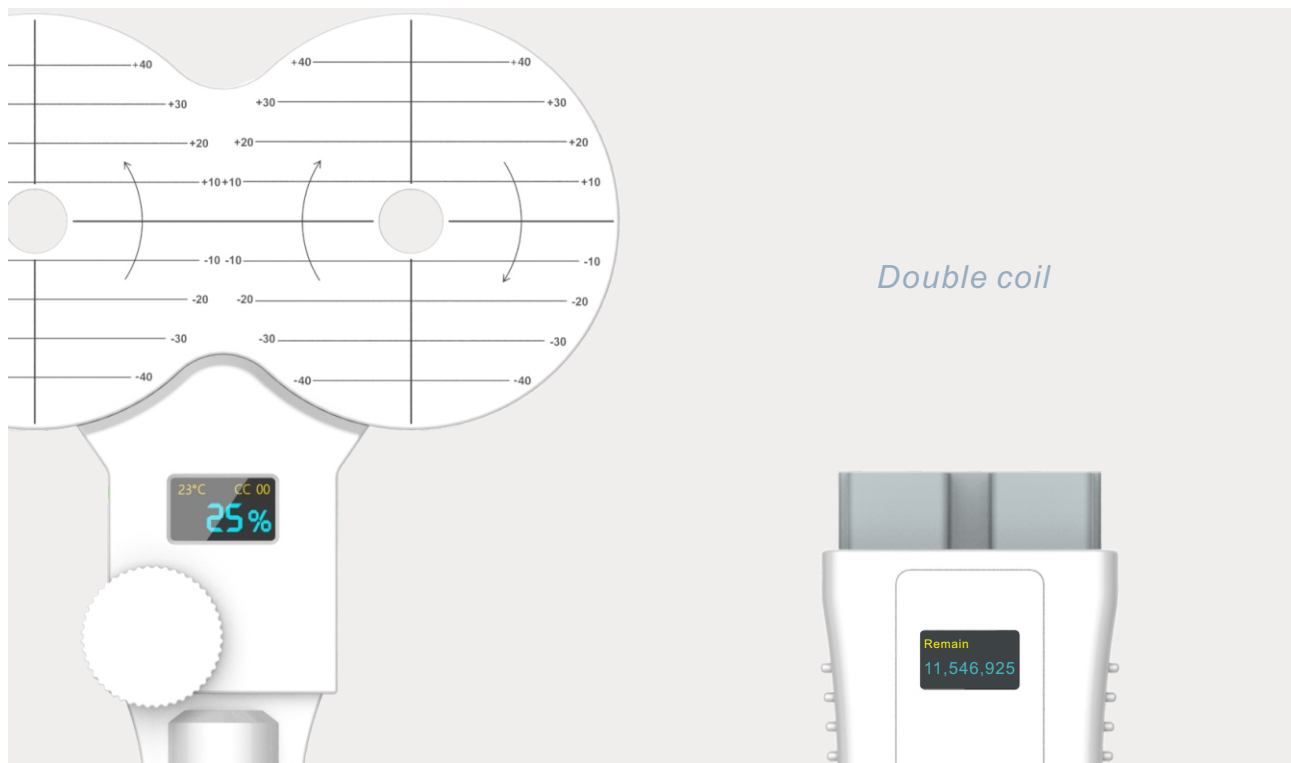
Intelligent control module, liquid cooled coil, coolant, cooling-cycle unit, power unit



Advantages:

- **Highly effective cooling system:** the patented non-heating coil technology can work for a long time continuously;
- **Safety:** external circulation closed technology eliminates the potential risk of liquid leakage, electric shock, and burn;
- **Long service life:** the coolant won't electrolyze or corrode, blocking the coil;
- **Convenient maintenance:** the liquid needn't be replaced or replenished frequently;
- **Easy to replace:** users can replace the coil by themselves;
- **Intelligent monitoring:** automatic measurement of temperature, available liquid volume, and circulation state

Customizable Stimulation Coils

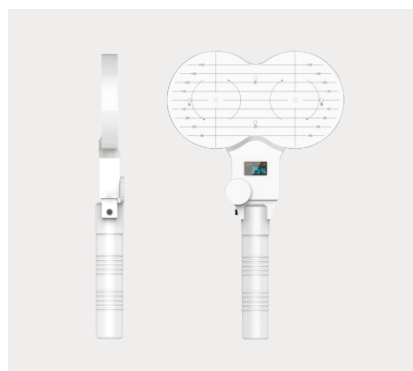


Product Characteristics

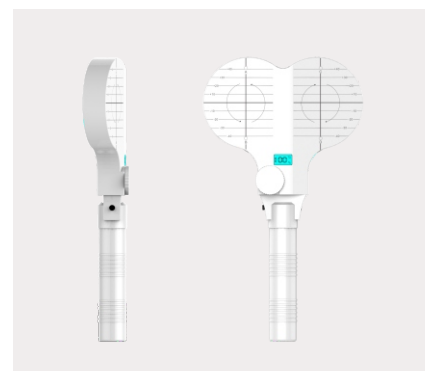
- **Multiple cooling methods:** passive cooled coil, air cooled coil and liquid cooled coil;
- **Highly effective cooling:** external circulation system with intelligent liquid cooling;
- **Easy maintenance:** users can replace the coil by themselves onsite;
- **Smart display:** temperature and pulse intensity displayed in real time, as well as the number of remaining pulses available (up to 20 million);
- **Intensity adjustment:** the knob on the coil enables easy adjustment of stimulation intensity;



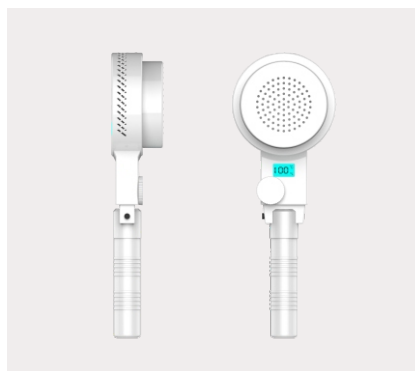
Liquid-cooling circular coil



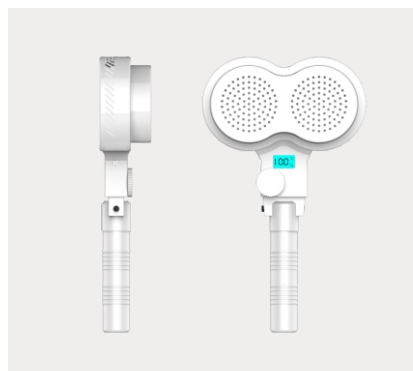
Liquid-cooling butterfly coil



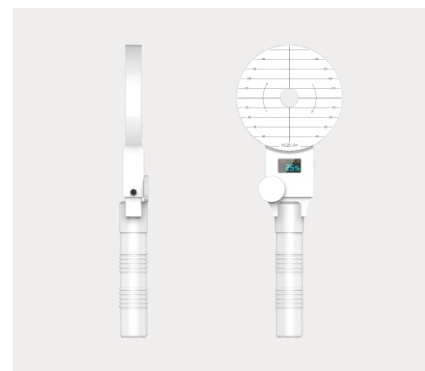
Liquid-cooling double cone coil



Air-cooling circular coil



Air-cooling butterfly coil



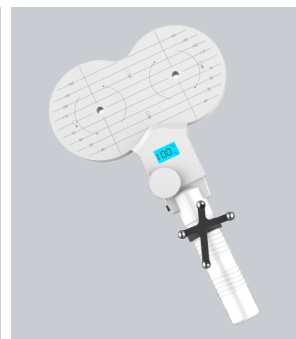
Passive circular coil

TMS Navigation System



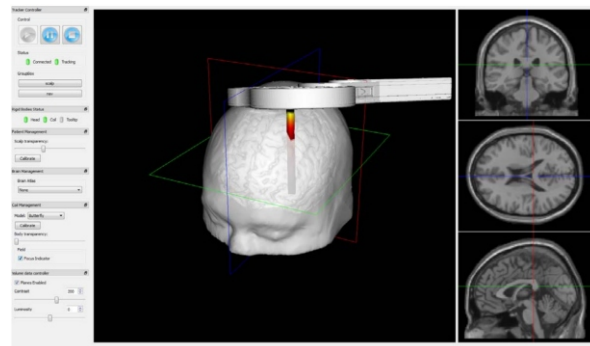
Characteristics:

- Dual display to monitor planning and stimulation;
- NDI high-resolution camera: precision up to 0.25mm;
- MRI and fMRI overlays to guide coil localization and pulse targeting;
- Save and export data easily



Application Field:

- Research: cognitive neuroscience, perceptual processes, attention, language, aging, and more;
- Clinical and basic science applications: neurology, psychiatry, rehabilitation, pediatrics, and more.





Robot arm-Tracking head movement automatically

- **Tracking head movement automatically**

The robotic arm can place the coil on the stimulation target automatically; the coil will track the head movement and stimulate intelligently.

- **Precise positioning**

Based on a 3D head model calculated with individual MRI, a spatial location algorithm maps the stimulation target to the 3D head model, and the coordinates of the defined target point update the intelligent tracking system in real time.

- **Intelligent image processing**

The system supports MRI with intelligent segmentation and fusion. 3D reconstruction enables easy localization of stimulation target.

- **Localization reproducibility**

Stimulation location and angle are saved automatically, to achieve precise and consistent stimulation across sessions.

- **Robotic arm with six-degrees of freedom**

The flexible actuator and multiple degrees of freedom enable to stimulate the whole brain area.

Dual Channels MEP- External Module

Single-pulse transcranial magnetic stimulation of motor cortex produces a neuroelectrical signal known as the Motor Evoked Potential (MEP). In clinical applications, the waveform, conduction velocity, latency, and amplitude of the MEP are tools used to diagnose and evaluate central and peripheral motor pathway function.



Application

- Evaluation of spinal cord injury (SCI) and intraoperative monitoring (IOM);
- Evaluation of function in patients with stroke;
- Measuring cortical inhibition in Parkinson's disease;
- Determining the nerve impulse conduction velocity of demyelination lesions;
- Assessing cerebral atrophy and central nervous conduction time (CMCT) in multiple sclerosis

Advantages

- Wireless transmission, easy operation, high signal-to-noise ratio (SNR);
- Dual channel design for a wide range of clinical applications;
- High sampling rate to capture the contours of the EMG wave;
- Unique waveform processing algorithm for high diagnostic sensitivity and specificity;
- Dedicated cone coil for lower-limb MEP determination

Paired pulsed Transcranial Magnetic Stimulation (ppTMS): two pulses delivered within a short time interval (e.g., 0-100ms) via one or two coils.

Advantages

- Protocols supported: one-coil paired stimulation, two-coil paired stimulation, central/peripheral paired association stimulation, and more;
- Inter-stimulus interval (ISI): 0-100ms (adjustable);
- Multiple stimulation models: single pulsed stimulation, rTMS, ppTMS, theta burst stimulation;
- Two sets of charge and discharge systems can treat two patients simultaneously

Application

Excitatory and inhibitory neurotransmission in cortical neurons:

Short-interval intracortical inhibition (SICI), long-interval intracortical inhibition (LICI), intracortical facilitation (ICF), short-interval intracortical facilitation (SICF), interhemispheric inhibition (IHI);

Clinical Treatment:

Effects of stimulation are enhanced by adjusting the stimulation intensity and the ISI. Protocols involving ppTMS are widely used in psychiatry, psychology, neurology, rehabilitation, and addiction.



Sub-chassis with paired coils



Sub-chassis with single coil



TMS system with paired coils



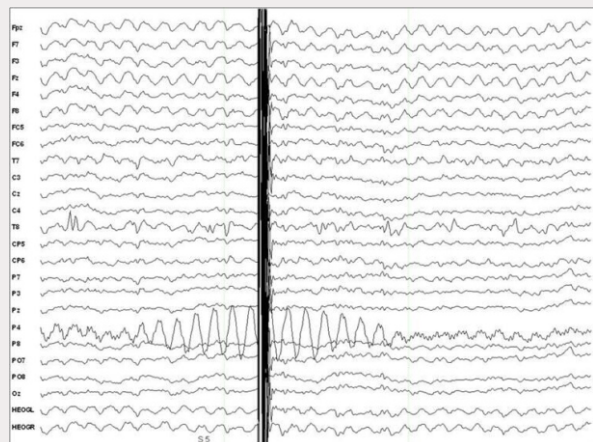
The combination of TMS with electroencephalography (TMS-EEG) is a rapidly developing area of research. It can measure electrical changes – in the stimulation area and downstream brain regions – in real time to evaluate the neural and conductive effects of stimulation. The synchronous recording of TMS-EEG can track the precise effects of TMS pulses.

The event-related potential (ERP) technique is one useful method for analyzing the EEG signal. ERPs and continuous EEG methods can be used to evaluate neuronal activity after brain injury, and to study sleep states and cognitive function.

There have been many methodological challenges facing EEG-TMS, such as: EEG amplifier saturation, electrode heating, high frequency noise in the electrode under the coil, movement & motion artifact in the EEG signal, and capacitor recharge induced artifact in the EEG. To conquer these problems, we introduce the BrainAmp DC EEG amplifier from Brain Products GmbH.

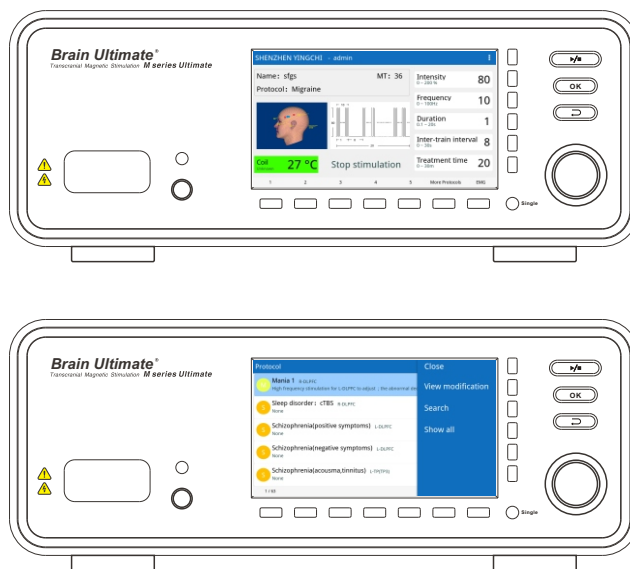
Advantages

- Low profile EEG-TMS electrode cap: 4mm;
- Modular design of amplifier;
- Rapid recovery of the EEG amplifier after the TMS pulses;
- Signal transmission: high fidelity fiber optics



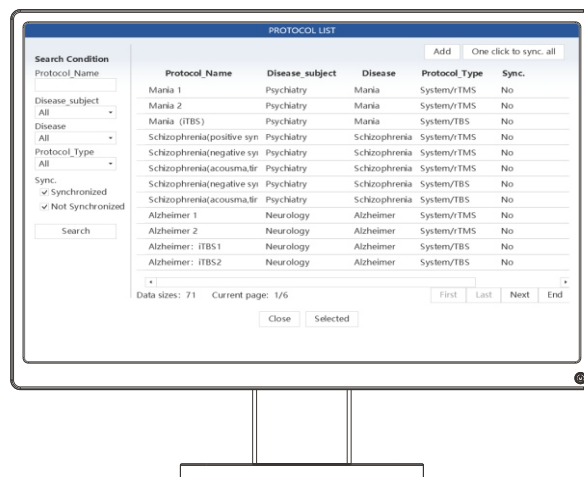
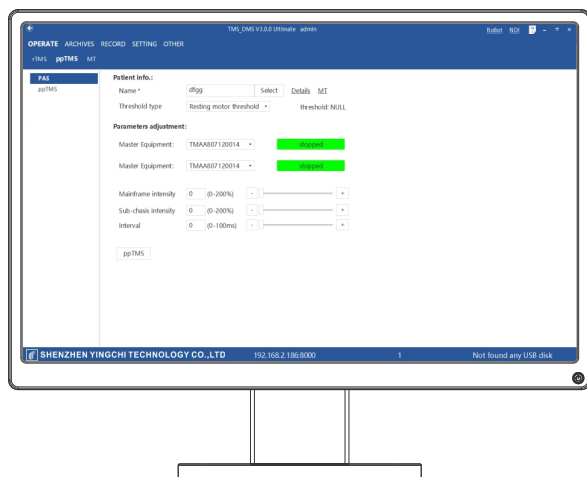
All-in-one system (built-in operation system)

- Built-in protocol and positioning map;
- Patient and protocol easily saved by USB;
- Triggering in/out interface;
- Easy to operate buttons and rotary knob



PC operation system

- Easy to create/manage protocols and patient information;
- Easy to export or print reports;
- Operate ppTMS, navigator, robot arm, and other external devices





SHENZHEN YINGCHI TECHNOLOGY CO.,LTD.

Address: B301, Digital Building, 1079 Nanhai Road, Nanshan District, Shenzhen, China
P.C.: 518067

Marketing hotline: +86 0755-26892079; +86 0755-26475399

Email: sales@ying-chi.net

www.ying-chi.net

American Branch: **Brain Ultimate, Inc.**

Address: 2348 Loraine St NE, Atlanta, GA 30319, USA

Tel: 770-378-678585

www.brainultimate.net

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