

# Depth of Anesthesia and Sedation Monitor MGA-06



Complete solution for anesthesiologists:  
Monitoring of Sedation Level



MGA-06 is a monitor assessing depth of anesthesia and designed to improve patient safety through long and continuous monitoring of the Brain Activity Index (AI).

**Application:** anesthesiology, including perioperative period, resuscitation, intensive care, procedural sedation.

The Depth of anesthesia and sedation monitor MGA-06 is the solution for the daily routine depth of anesthesia monitoring. Features such as low running cost, robust technology and flexible concept due to its reliable clamp and built-in battery could make the device a standard monitoring tool in a medical institution, thereby increasing the patient's safety and quality of patient care.



Touch screen  
TFT-display, 5"

ON button and  
light indicators

Connector for  
power adapter

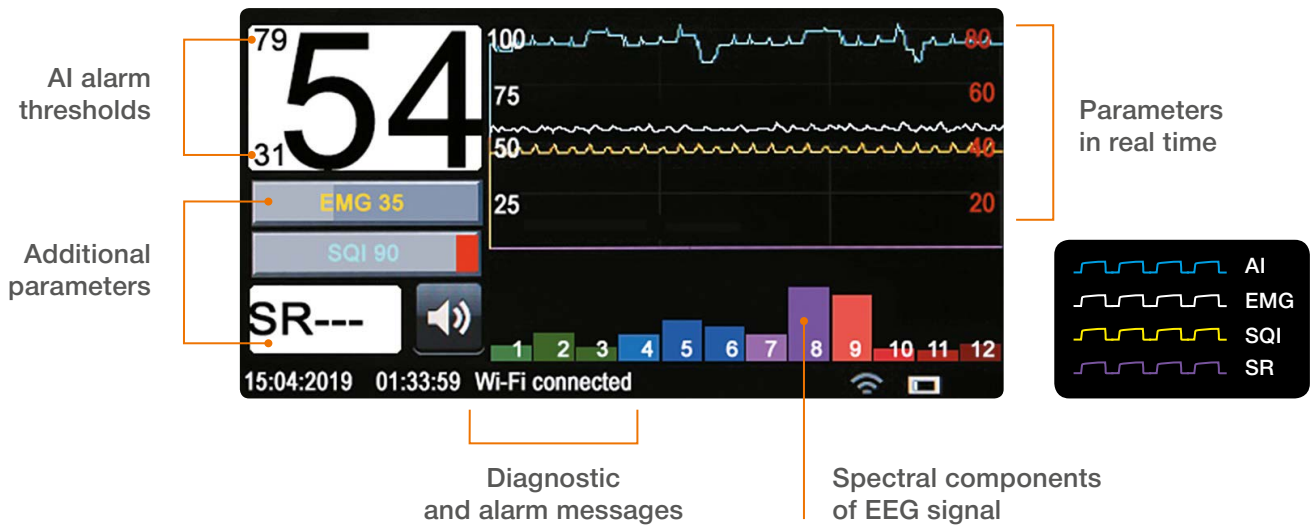
Clamp holding

Connector for depth of anesthesia  
and sedation module

### Parameters Identified by MGA-06

AI	Brain Activity Index	Indicates the level of conscience depression by analyzing EEG, taking into account information on typical signs of anesthetics' impact on patients
SR	EEG Signal Sippretission Rate	Reflects the relative duration of EEG suppression segments in the current time interval
SQI	EEG Signal Quality Index	Reflects the accuracy level of calculated AI (Brain Activity Index)
EMG	Electromyographic component level	Indicates the level of electrical activity of facial muscles
Z1, Z2, Z3	Electrode impedance	Demonstrates the quality of electrodes application and electrodes' electric contact with the patient's skin

# Main Screen

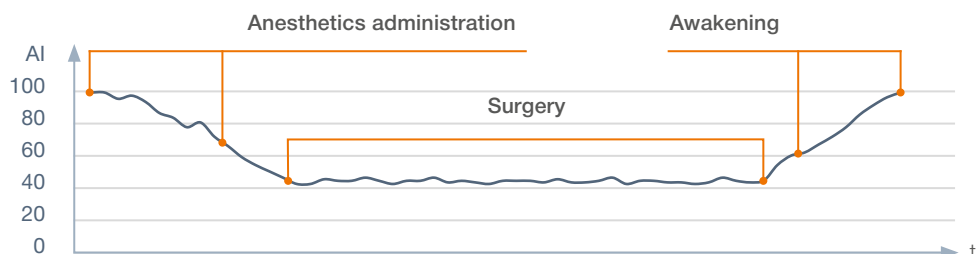


## Interpreting AI (Brain Activity Index) Data\*

AI value**	Clinical stages of anesthesia	Clinical signs
90–100	Awake	
80–90	Anesthesia stage I – light sedation	Incomplete awakening, patient opens eyes and maintains visual contact in response to a voice for 10 seconds or less
60–80	Anesthesia stage II – sedation	Patient moves and opens eyes in reaction to voice but does not fix the eyes – no visual contact or no response to voice but eye movements and eye opening after a physical stimulation persists
40–60	Anesthesia stage III – surgical state	No response to voice or physical irritants
30–40	Anesthesia stage IV – deep anesthesia, BS (burst – suppression) patterns emerge	
20–30	Anesthesia stage V – deeper anesthesia compared to stage IV, length of suppression episodes may reach 10 seconds	
0–10	Anesthesia stage VII – extremely deep anesthesia, suppression episodes constitute 75% and more of the whole signal duration	

\* According to a generally accepted classification of anesthesia stages.

\*\* The same value of AI (Brain Activity Index) in two lines means the limits of indicators' range.



# Operational Advantages

## Simple and safe

Non-invasive technology;  
visual and audible alarm system;  
intuitive interface;  
sensitive touch screen;  
built-in battery.

## Reliable and accurate

Accurate monitoring of sedation level due to the high sensitivity of signal processing algorithm. Short operation mode setup time.

## Convenient

Small-size, mobile;  
easy fits to any environment due to the reliable clamp;  
light weight;  
no routine maintenance.

## Low cost

Neglectable running cost;  
standard consumables (EEG electrodes) available worldwide.

## All-purpose

Works with both inhaled and intravenous anesthetics. Increase patient's safety when used together with Multigas Analyzer AMG-06.



To improve patient's safety you can use Depth of anesthesia and sedation monitor MGA-06 with Multigas Analyzer AMG-06

AMG-06 is intended for continuous non-invasive side-stream monitoring of CO<sub>2</sub> & anesthetics concentration in inspired and expired gases. The device also determines RSP, apnea, MAC index and measures atmospheric pressure in operating rooms and wards when providing anesthetic support.

More on [www.treat-on.com](http://www.treat-on.com)

# Advantages of Anesthesia Depth Monitoring

## Potential Effects of Inadequate Sedation\*

With continuously raising requirements to ensuring patient's safety, physicians have to provide more careful control of using anesthetics, hypnotic drugs or sedatives. According to the statistics, more than 69% of patients demonstrate inadequate sedation – either insufficient or too deep. This can cause adverse effects both during the surgery and at the post-operative stage.

## Potential Effects of Inadequate Sedation\*

Insufficient sedation	Excessive sedation
Excitation	Depressed breathing, hypotonia, depressed gastrointestinal tract motility
Sleep violations	Prolonged depression of conscience
Myocardial ischemia	Prolonged ventilation duration
Unsynchronized ventilation	Prolonged stay at ICU and clinic in general
Self-extubation	Increased healthcare costs

Posttraumatic distress and depression

\* Mehta S. Sedation Strategies in the Critically Ill // Yearbook of Intensive Care and Emergency Medicine, 2005.

Using MGA-06 minimizes the adverse effects of inadequate sedation, ensuring optimal and predictable sedation level and patient's quicker recovery from anesthesia.

## Preventing Anesthesia Awareness

Anesthesia awareness is post-operative recollections of the event happening during general anesthesia, caused by misalignment between the need for anesthetic and its delivery.

**The following patients are in the risk group for anesthesia awareness:**

- taking opiates or alcohol;
- using neuromuscular relaxants;
- suffering from respiratory problems;
- with previous cases of accidental awakening during the surgery;
- with a co-pathology;
- elderly.

Anesthesia awareness cannot be measured directly. Traditional clinical signs like motions, tachycardia, hypertension, pupillary reaction and lacrimation are supposed to be unreliable predictors of anesthesia awareness but they must be monitored in every patient and considered substantially.

## Individual Selection of Sedative Doses

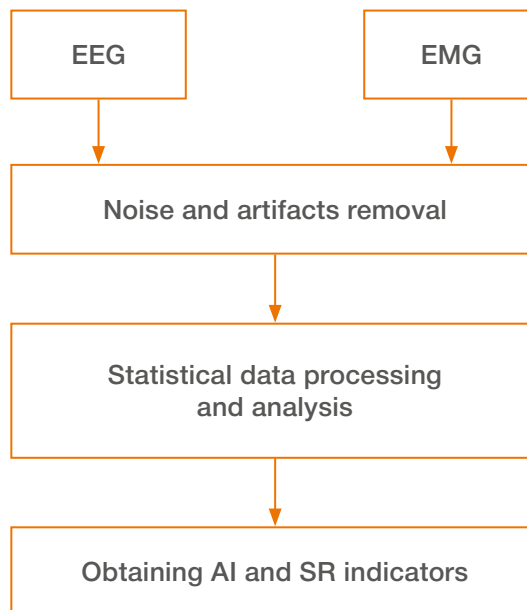
Selecting the optimal drug dosage with MGA-06 is based on EEG analysis and displaying the AI (Brain Activity Index), taking into account individual body features and the clinical situation.

**This approach ensures:**

- maximum safety and efficiency of the delivered anesthetic support;
- reducing the risk of drugs' adverse effect on the body;
- saving expensive drugs.

# Algorithm of AI (Brain Activity Index) Calculation

Anesthesia depth assessment is based on a comprehensive electroencephalogram (EEG) analysis using unique algorithms developed by Triton Electronic Systems engineers. A simplified algorithm for AI (Brain Activity Index) calculation is performed below.



MGA-06

EEG and EMG signals are registered from the electrodes applied on the frontotemporal area of the patient's head.

The registered signal is subjected to digital filtration: motion artifacts, power main disturbances and noise from electrosurgical equipment, other bioelectrical signals, etc. are removed.

The algorithm of EEG analysis includes statistical information on typical signs of various groups of anesthetics' impact on the patient's EEG. During the analysis, the level of compliance is established between the registered EEG signal and each type of conscience depression.

**As a result of data analysis, the following indicator values are obtained:**

AI (Brain Activity Index);  
 SR – EEG Signal Suppression Rate, taking into account the total duration of segments with low-voltage activity (suppression segments) over the last minute. Displayed as a percentage. SR > 0 is usual at AI < 50.

### Signal quality

**To get accurate data on anesthesia depth monitoring:**

- assess the signal quality continuously;
- provide control of electrodes' impedance;
- prevent impedance values from increasing;
- minimize artifacts and other noise.

**For this purpose, the following technical solutions are implemented in MGA-06 monitor:**

SQI (Signal Quality Index) is continuously monitored. It takes into account the values of EEG cable electrode' impedance, noise level from artifacts, high-frequency noise and power main disturbances within EEG, etc.

If SQI = 0, displaying the values of AI (Brain Activity Index), SR rate and EMG Component Level is blocked. A message on the most significant cause for SQI dropping is displayed.

The level of EEG signal noise is measured continuously.

The electrodes impedance is measured automatically every 6 minutes; it can also be launched manually by the user.

Besides, to identify impedance changes or electrodes drop (in case of rapid changes of the noise background within the EEG signal), measurement of electrodes impedance is launched automatically.



# Technical Specification

Patient age groups	Adults and pediatric
Display	5" color TFT touch screen
Dimensions	150x140x105 mm
Operation mode setup time	≤ 10 sec
Weight of the device (with built-in battery)	0.8 kg
Power supply	100–240 V, 50/60 Hz Built-in battery (at least 2 hours of operation)
Mounting system	360° rotated clamp
Displayed parameters	Brain Activity Index EEG Signal Suppression Rate EEG Signal Quality Index Electromyographic component level Electrodes impedance (Z1–Z3)
Trends	AI, EMG 72 hours
Alarms	Visual and sound alarm
Connection to external medical information systems	Wi-Fi
Languages	Multi-language
Screen keyboard	For Wi-Fi settings and entering patient information
Recording patient information	Age, gender, weight, height, date of admission, diagnosis at admission, clinical diagnosis, notes
The recommended types of electrodes	31.1245.21, 24 mm, Covidien LLC, USA; F9079/RU3236-100 FIAB SpA, Italy; White Sensor 40713 Ambu A/S, Denmark; G210C/F-150S Nihon Kohden Corporation, Japan.

We continuously improve the technological principles and implement new profitable solutions based on market demands



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