

ANESTHESIA. PERSONALIZED.

Bispectral Index™ (BIS™) monitoring system product guide

The Bispectral Index™ (BIS™) monitoring system can give you meaningful information to help individualize and optimize anesthetic dosage — for the best possible outcome.

Studies show that BIS™ technology-guided anesthesia:



REDUCES:

- Anesthesia use by as much as 38 percent¹⁻⁷
- Awareness with recall by 64 percent^{8,9}
- Incidence of postop complications^{3,10,11}
- Costs^{8,12-17}



LESS INCIDENCE OF:

- Postop delirium in elderly and at-risk patients^{3,6,7,10,11,15-17,19}



IMPROVES:

- Patient satisfaction²⁰
- Patient outcomes^{2,14,20}
- Patient quality of life^{5,7}



FASTER:

- Wake ups^{1,2}
- Recovery time^{1,2,7,20}
- Discharges from PACU⁵

INSIGHTS FROM RELIABLE DATA

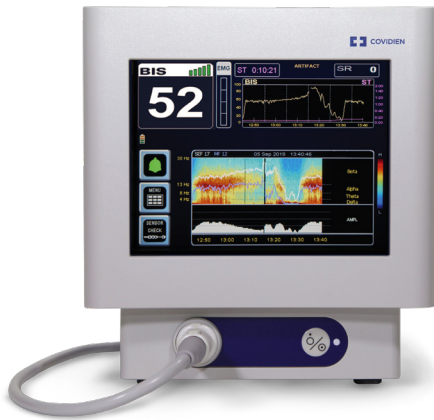
Reliable data based on objective, quantified science. We know how important it is.

BIS™ system monitors use innovative technology to link patient-specific EEG information to individual clinical states.

Here's how it works:

1. Sensors collect the raw EEG data that indicates brain activity in real time.
2. The system uses its clinically validated algorithm to filter, analyze, and correlate the data.
3. Results are continually calculated and displayed as the BIS™ index value (a number between 0 and 100), indicating the patient's response to anesthetic agents.

You may improve clinical outcomes by customizing individual dosing to keep the BIS™ monitor value within the target range during all phases of anesthesia.^{1,5,8,9,20-23}



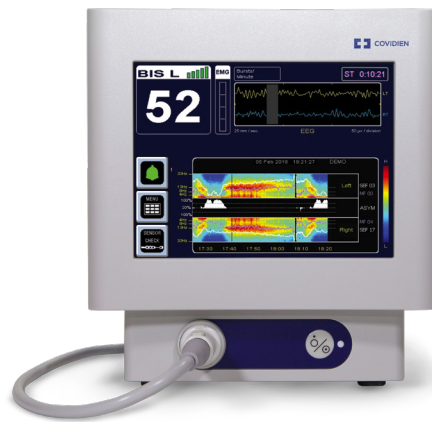
2-channel monitor

The BIS™ monitoring system with 3.50 software — a full featured, anesthetic depth monitoring solution.

Features:

- Density Spectral Array (DSA) with visual display of EEG bands
- Spectral Edge Frequency (SEF)
- Median Frequency (MF)1–34–6,10,12
- Suppression Time (ST)
- Suppression Ratio (SR)

Part number 186-0210



4-channel monitor

The same proven BIS™ monitoring system with 3.50 software also with enhanced bihemispheric capabilities.

Combine it with our bilateral sensors to detect hemispheric differences in the brain. It has the same features as the 2-channel monitor, but also includes:

- Asymmetry indicator (ASYM)
- Ability to display from the left and right side of the brain
- Burst Count

Part number 186-1014



BIS™ LoC 2 channel with patient interface cable (PIC+)

Product ID: 186-0195-AMS

PIC+ only: 186-0107



BIS™ LoC 4 channel with patient interface cable (PIC-4)

Product ID: 186-0224-AMS

PIC-4 only: 186-1018-AMS

IMPROVE PERFORMANCE

High-quality sensors that are easy to apply, with positioning instructions printed right on them. They adhere well to skin and are comfortable for your patient. Limited to short term use (maximum of 24 hours).

BIS™ quatro 4-electrode sensor

Measures brain activity in adult patients undergoing general anesthesia or sedation.

Part number 186-0106, box of 25



BIS™ pediatric sensor*

Measures brain activity in pediatric patients.

Part number 186-0200, box of 25

*Ages four and up recommended.

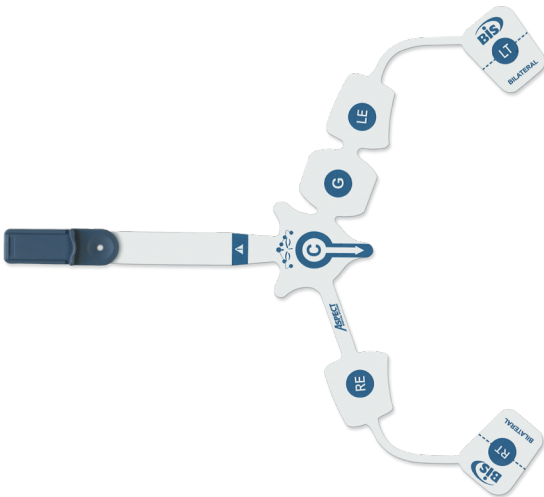


BIS™ bilateral sensor**

Lets you detect hemispheric differences in the brain, which may be useful for advanced monitoring applications.

Part number 186-0212, box of 10

**Not compatible with BIS™ 2-channel systems. BIS™ LOC 4-channel cables required.



BIS™ extend sensor (extended use)

Measures brain activity in adult patients who require longer periods of monitoring, including those in the ICU.

Part number 186-0160, box of 25



Talk to your Medtronic representative to order BIS™ monitors and sensors.

- Gan T, Glass P, Windsor A, et al. Bispectral index monitoring allows faster emergence and improved recovery from propofol, alfentanil, and nitrous oxide anesthesia. *Anesthesiology*. 1997;87(4):808–815.
- Punjasawadwong Y, Phongchiewboon A, Bunchungmongkol N. Bispectral index for improving anaesthetic delivery and postoperative recovery (Review). *Cochrane Database Syst Rev*. 2014;17(6):CD003843.
- Chan M, Cheng B, Lee T, Gin T, Trial Group. BIS-guided anesthesia decreases postoperative delirium and cognitive decline. *J Neurosurg Anesthesiol*. 2013;25(1):33–42.
- Lewis SR, Pritchard MW, Fawcett LJ, Punjasawadwong Y. Bispectral index for improving intraoperative awareness and early postoperative recovery in adults. *Cochrane Database Syst Rev*. 2019; 26;9:CD003843.
- Punjasawadwong Y, Chau-In W, Laopaiboon M, Punjasawadwong S, Pin-On P. Processed electroencephalogram and evoked potential techniques for amelioration of postoperative delirium and cognitive dysfunction following non-cardiac and non-neurosurgical procedures in adults. *Cochrane Database Syst Rev*. 2018;5:CD011228.
- Liu SS. Effects of bispectral index monitoring on ambulatory anesthesia: a meta-analysis of randomized controlled trials and a cost analysis. *Anesthesiology*. 2004;101(2):311–5.
- Song D, Joshi GP, White PF. Titration of volatile anesthetics using bispectral index facilitates recovery after ambulatory anesthesia. *Anesthesiology*. 1997;87(4):842–8.
- Myles P, Leslie K, McNeil J, Forbes A, Chan M. Bispectral index monitoring to prevent awareness during anaesthesia: the B-Aware randomised controlled trial. *Lancet*. 2004;363(9423):1757–1763.
- Ekman A, Lindholm M, Lennmarken C, Sandin R. Reduction in the incidence of awareness using BIS monitoring. *Acta Anaesthesiol Scand*. 2004;48(1):20–26.
- Radtke F, Franck M, Lendner J, Kruger S, Wernecke K, Spies C. Monitoring depth of anaesthesia in a randomized trial decreases the rate of postoperative delirium but not postoperative cognitive dysfunction. *Br J Anaesth*. 2013;110(S1):98–105.
- Sieber F, Zakriya K, Gottschalk A, et al. Sedation depth during spinal anesthesia and the development of postoperative delirium in elderly patients undergoing hip fracture repair. *Mayo Clin Proc*. 2010;85(1):18–26.
- Klopman M, Sebel P. Cost-effectiveness of bispectral index monitoring. *Curr Opin Anaesthesiol*. 2011;24(2):177–181.
- Fritz B, Kalarickal P, Maybrier H, et al. Intraoperative Electroencephalogram Suppression Predicts Postoperative Delirium. *Anesth Analg*. 2016;122(1):234–242.
- Liu J, Singh H, White P. Electroencephalographic bispectral index correlates with intraoperative recall and depth of propofol-induced sedation. *Anesth Analg*. 1997;84(1): 185–189.
- Ahmad S, Yilmaz M, Marcus RJ, Glisson S, Kinsella A. Impact of bispectral index monitoring on fast tracking of gynecologic patients undergoing laparoscopic surgery. *Anesthesiology*. 2003 Apr;98(4):849–852.
- Satisha M, Sanders GM, Badrinath MR, Ringer JM, Morley AP. Introduction of bispectral index monitoring in a district general hospital operating suite: a prospective audit of clinical and economic effects. *Eur J Anaesthesiol*. 2010 27(2):196–201.
- Shepherd J, Jones J, Frampton G, Bryant J, Baxter L, Cooper K. Clinical effectiveness and cost-effectiveness of depth of anaesthesia monitoring (E-Entropy, bispectral index and Narcotrend): a systematic review and economic evaluation. Health technology assessment (Winchester, England). 2013;17(34):1–264.
- Zhang C, Xu L, Ma Y-Q, et al. Bispectral index monitoring prevent awareness during total intravenous anesthesia: a prospective, randomized, double-blinded, multi-center controlled trial. *Chin Med J (Engl)*. 2011;124(22):3664–9.
- Whitlock E, Torres B, Lin N, et al. Postoperative delirium in a substudy of cardiothoracic surgical patients in the bag-recall clinical trial. *Anesth Analg*. 2014;118(4):809–817.
- Luginbühl M, Wüthrich S, Petersen-Felix S, Zbinden AM, Schnider TW. Different benefit of bispectral index (BISTM) in desflurane and propofol anesthesia. *Acta Anaesthesiol Scand*. 2003;47(2):165–173.
- White PF, Ma H, Tang J, et al. Does the use of electroencephalographic bispectral index or auditory evoked potential index monitoring facilitate recovery after desflurane anesthesia in the ambulatory setting? *Anesthesiology*. 2004;100:811–817.
- Avidan MS, Zhang L, Burnside B, et al. Anesthesia awareness and the bispectral index. *N Engl J Med*. 2008;358:1097–1108.
- Avidan MS, Jacobsohn E, Glic D, et al. Prevention of intraoperative awareness in a highrisk surgical population. *N Engl J Med*. 2011;365:591–600.