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Neuromaster G1

Patient-focused intra-operative monitoring

The Neuromaster G1 has been designed specifically for the demands of the operating room. The Neuromaster's primary aim is to prevent neurophysiological damage and support accurate prognosis. Its ultra-quiet amplifier provides SSEP, ABR, EMG, EEG and MEP recordings with minimal noise. These multi-modality protocols, combined with its ease-of-use and flexibility, make the Neuromaster G1 the clear choice for all intra-operative monitoring scenarios.

The Neuromaster G1 offers the most advanced technology, which gives clinicians the confidence that they have the right tools to accommodate each individual patient, every time.



Neuromaster G1

Pioneering technology

Innovative approach

Nihon Kohden's pledge to improve healthcare with advanced technology is exemplified by the release of the Neuromaster G1. Some of its latest features include advanced multi-train stimulation, full EEG recording capabilities, and an 8-output TcMEP switch box.

Adaptable design

A strong emphasis has been placed on flexibility and configurability. Multi-modality protocols are fully customizable and can be created with ease. Quick-connect breakout boxes eliminate the need to unplug each individual electrode when repositioning the patient. High- and low-output stimulation can be programmed to deliver constant current or constant voltage, always complying with your departmental standards.

Durable hardware

Our robust amplifier and component design provides durability for optimal data collection, even in the adverse surroundings of an operating room. The amplifier benefits from the excellent signal processing qualities you come to expect from Nihon Kohden.

Seamless workflow

Nihon Kohden's world class EEG Neurofax and EP Neuropack software packages are utilized within the Neuromaster software. This provides familiarity for current customers and a seamless interface across our Neurology product range.

Practical configuration

The Neuromaster G1 comes in two configurations: laptop and cart-based models. Our light-weight, compact laptop system is designed for travel convenience. Our cart-based model features a large screen display to optimize data visualization and is designed as an ergonomic, mobile solution by minimizing its foot-print while maximizing workspace.

Acquisition

Ultra-quiet 16- or 32-channel amplifier:

You can choose between 16 or 32 channels. The amplifier continues Nihon Kohden's tradition of durability, reliability and quiet data acquisition. The front panel can be removed, exposing 32 inputs for direct electrode connection.



32-channel Amplifier(JB-232B)

16 input acquisition breakout box (JB-210B):

The Neuromaster G1 can also be configured with as many as four breakout boxes, each with 16 inputs and one ground. The convenient 10-meter breakout box cables can reach even the most remote parts of the operating room. The quick disconnect on each breakout box makes repositioning the patient easy for cases with dual approaches, eliminating the need to unplug each individual electrode.



Acquisition breakout boxes (JB-210B)

Stimulation

10-channel electrical breakout box (JS-201B to JS-204B):

The Neuromaster G1's electrical breakout stimulators are the most unique on the market. The system's four quick-connect stimulators can be cascaded to simplify cable management while increasing safety and efficiency. Each electrical breakout box contains eight high-output channels and two low-output channels. These can be programmed to deliver constant current or constant voltage stimulation.



Quick-connect stimulation breakout boxes (JS-201B to JS-204B)

The high-output channels are connected by a single reference cathode for procedures that require the use of multiple handheld stimulator types. The low-output channels can be programmed for monophasic or biphasic stimulation and have an increased level of accuracy to safely stimulate the sensitive tissue of the neuroanatomy.

8-output TcMEP switch box (JS-210B):

With our unique TcMEPro™ matrix stimulator design, patient-specific protocols can be created with ease by tailoring parameters, such as duration, inter-stimulus-interval (ISI) and train length. The switch box has eight outputs, each of which can be programmed for anodal or cathodal stimulation. The stimulator can be constant current to 250mA or constant voltage to 1000V. Alternatively, an in-built TcMEP stimulator is located on the main unit.



8-output TcMEP switch box (JS-210B)

Freedom of operation

The requirements of the surgical procedure should determine the way you use the system, not the other way around. Neuromaster G1 is designed with this in mind and has a fully customizable display to suit your needs and complement your workflow.

The results are displayed in a format to facilitate accurate and timely interpretation, locally or using Nihon Kohden's remote viewing software. Evoked responses are displayed and stored continuously and the acquired waveforms can be viewed in a waterfall, cascaded and/or in a trending graph format. Monitor and store EEG and EMG free run waveforms continuously and/or periodically during triggered events. EEG can be presented in a waterfall format using either Compression or Density Spectral Array, while advanced users can utilize the many tools offered by Nihon Kohden's world class EEG Neurofax software.

During all measurements, pre-registered and custom events can be entered and time-locked at any point during the procedure.

Waterfall/trend graph window

Displays:

- Baseline, current and previous EP waveforms
- Graph of measurement data
- EEG data in CSA or DSA graphs
- Current display or look-back mode
- Ability to hide unwanted waveforms
- Linear graph of measurement data (latency, amplitudes, frequency, etc.)
- Event page
- Numerical values of measurement data

Event window

- Displays time and comments
- 50 preprogrammed events
- Free text for custom event logs
- Capture patient image with inputting events
- Editing events is available

Free-run (EMG) window

- Displays up to 32 waveforms
- Turn on or off waveforms from window
- Store continuously or periodically
- Layout in monitoring, stack or side by side for easy comparison
- Stimulation is available

EP window

- Up to 32 EP waveforms in 16 display areas
- Baseline, current and previous waveforms
- Latency and amplitude measurements
- All channel or individual channel control
- Auto sequence: automatically start, stop, and restart
- Displays montage, time, average/reject counts, intensity
- Step back feature allows removal of noisy average
- Live video display from microscope and slave monitor or camera
- Snap shot saves one frame of patient image as a JPEG file

EEG window

- Displays up to 32 channels of EEG
- Store continuously or periodically
- Span can be adjusted in window
- Layout in monitoring, stack or side by side for easy comparison
- Stimulation is available
- Turn on or off waveforms from window
- Fully integrated advanced EEG monitoring, utilizing our dedicated EEG Neurofax software:
 - EEG advanced trending program
 - Vital signs monitor integration
 - Live View Panel offers intuitive real-time management of diverse neuromonitoring data from a centralized location

NeuroReport

- Create an itemized report using screenshots taken during the case
- Print event list, trend graphs, EEG, EMG or waterfall waveforms and numerical values
- Store as a file linked to the patient database node, which helps eliminate the need for paper.

Remote monitoring and network integration

Using Nihon Kohden's remote software, the remote viewer display is totally independent of the acquisition screen. The remote viewer can view trend graphs, waterfall waveforms or previous data/numerical values without affecting the acquisition screen.

The Neuromaster G1 data can be administered in the same data management system that is used in other Neurology products from Nihon Kohden. This database links to external hospital information systems via HL7 and allows you to input, schedule, review, and search your patient lists with ease.

Specifications

Neuromaster G1 (MEE-2000)

Amplifiers

Number of channels	JB-232B: 32-channel JB-316B: 16-channel
Maximum number of connectable breakout boxes. (Maximum total of input jacks)	JB-232B: 4 (64-inputs) JB-316B: 2 (32-inputs)
Input impedance	>100 M Ω (differential mode), \geq 1000 M Ω (common mode)
Noise	4.5 μ Vpp (0.6 μ Vrms) or less at 1 Hz to 3 kHz with input shorted
Common mode rejection ratio	\geq 106 dB (balanced mode), \geq 112 dB (isolation mode)
Sensitivity	<i>EP/free-run waveform:</i> 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100, 200, 500 μ V/div, 1, 2, 5, 10, 20, 50 mV/div \pm 5% <i>EEG waveform:</i> 5, 7, 10, 15, 20, 30, 50, 70, 100, 150, 200, 300, 500, 750, 1000, 1500, 2000, 3000, 5000, 10000 μ V/div \pm 5%
Low-cut filter	<i>EP/free-run waveform:</i> 0.08, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 30, 50, 100, 200, 500 Hz, 1, 2, 3 kHz at 6 dB/oct (\pm 20%)
High-cut filter	<i>EP/free-run waveform:</i> 10, 20, 50, 100, 200, 500 Hz, 1, 1.5, 2, 3 kHz at 12 dB/ oct (\pm 20%), off <i>EEG waveform:</i> 15, 30, 35, 60, 70, 120, 300 Hz at 12 dB/oct (\pm 20%) <i>AC interference notch filter:</i> 50 or 60 Hz (Rejection ratio: < 1/20) <i>Amplitude calibration:</i> 1 div (within \pm 5%) <i>Skin-electrode contact impedance check:</i> 2, 5, 10, 20, 50, 100, 200, k Ω indication (within \pm 20%) <i>Electrode offset tolerance:</i> > \pm 950 mV

Dimensions and weight

Main unit (DC-200B)	400 (W) \times 63 (H) \times 315 (D) mm, 4.0 kg
Amp unit (JB-232B)	250 (W) \times 190 (H) \times 75 (D) mm, 2.0 kg
Breakout box (JB-210B)	47 (W) \times 153 (H) \times 30 (D) mm, 0.15 kg
Stimulation pod (JS-201B)	80 (W) \times 189 (H) \times 30 (D) mm, 0.3 kg
TcMEP switch box (JS-210B)	154 (W) \times 153 (H) \times 30 (D) mm, 1.3 kg

Power requirements

Line voltage	100 to 240 V AC \pm 10%
Line frequency	50/60 Hz
Power input	1000 VA (DC-200B)
Inrush current	30 A max/115 Vac, 60 A max/230 Vac (EMI capacitors excluded, cold start at 25°C)

Environment

Operating temperature	10 to 35°C (50 to 95°F)
Operating humidity	30 to 80%
Operating atmospheric pressure	700 to 1060 hPa
Storage temperature	-20 to +60°C (-4 to +140°F)
Storage humidity	10 to 95%
Storage atmospheric pressure	700 to 1060 hPa
Transporting temperature	-20 to +60°C (-4 to +140°F)
Transporting humidity	10 to 95%
Transporting atmospheric pressure	700 to 1060 hPa



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For more information, please contact Neurogen at:

Email: info@neurogenmedical.com
Tel: 0044 29 2002 3316