Neuromaster MEE-2000

Intra-operative monitoring system

NIHON KOHDEN

Patient-centric Monitoring

The Neuromasters ease-of-use, flexibility and multi-modality features make it the clear choice for all of your IOM needs.

The Operating Room is a fast-paced, stressful environment with unpredictable and diverse patient demographics. Compromising intraoperative monitoring care is not an option. For the first time, the new 32-channel MEE-2000 Neuromaster will give clinicians the confidence that they have the right tools to accommodate each individual patient, every time.

The MEE-2000 system performs comprehensive monitoring that is versatile and highly reliable. The system's 32-channel ultra quiet amplifier collects SSEP, ABR, EMG, EEG and TcMEPs with minimal noise in even the most hostile of environments. The results are displayed in a format to facilitate rapid interpretations, 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-1200 Neurofax software. During all measurements, manual or pre-registered events can be entered and time locked at any point during the procedure.

Clinical EPs are standard with the Neuromaster and use the same software as our MEB EMG/EP product line. This eliminates the need for additional training and provides a seamless interface for current Nihon Kohden users.

The Neuromaster comes in two configurations, laptop and cart-based model. The light weight laptop system is designed for travel convenience and can be ordered with a travel case for easy transfer in and out of a vehicle. Our rugged amplifier and component design warrants durability for optimal data collection.

Nihon Kohden's sleek cart configuration has two locking castor wheels and two directional locking wheels that make it easy to maneuver in and outside of the operating room. Its small design reduces the OR foot print while maximizing workspace.

Acquisition

JB-232
Ultra Quiet 32 Channel Amplifier

The 32 channel JB-232 amplifier continues Nihon Kohden's tradition of durability, reliability and quiet data acquisition. Monitor and store temperature and dual SpO_2, both standard with the system. The front panel can easily be removed, exposing 32 inputs that can be used for clinical evoked potentials or direct electrode input at the bedside.

JB-210
16 Input Acquisition Breakout Box

The Neuromaster can be configured with as many as four breakout boxes, each with sixteen inputs and one ground. The convenient twenty foot breakout box cables can be easily run up to the patient from even the most remote parts of the operating room. The quick disconnect on each breakout box makes flipping the patient easy for cases with dual approaches, eliminating the need to unplug electrodes.

Electrical Stimulators

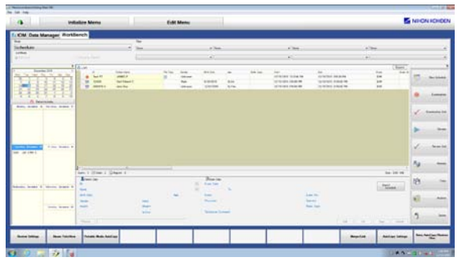
JS-210
8 Input TcMEP Matrix Stimulator

With our unique TcMEPro™ matrix stimulator design, patient-specific protocols can be created on the fly by tailoring parameters, such as duration, ISI and train length.
The matrix stimulator has eight output pins, each of which can be programmed for anodal or cathodal stimulation. The stimulator can be constant current to 250mA or voltage to 1000V.

JS-201-204
10 Channel Electrical Breakout Box

The MEE-2000 electrical breakout stimulators are some of the most unique on the market. The system's four quick-connect stimulators can be daisy chained in series simplifying cable management while increasing safety and efficiency. One unit contains eight high-powered outputs, and two low-powered outputs that can be programmed to deliver constant current or constant voltage. The high-powered output channels are tied together with a single reference cathode for procedures that require the use of multiple handheld stimulator types. The electric low outputs can be programmed for mono or biphasic stimulation and have an increased level of accuracy to safely stimulate the sensitive tissue of the neuroanatomy.

Flexible Software Innovation



Menu Window for IOM Examination

Launch an IOM examination by clicking on a button in the examination protocol menu.

Menu Tabs:

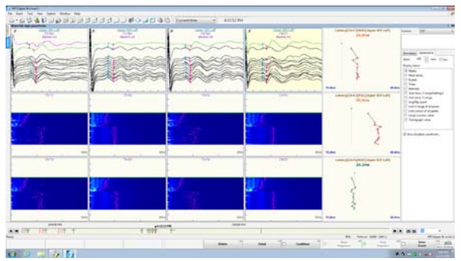
- Up to 8 category tabs with 10 programs per tab for a total of 80 preset examination programs

Data Manager Tab:

- Database files
- Copy, move and delete file
- Patient database with search and query function

Workbench Tab:

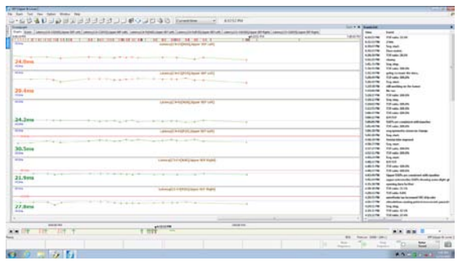
- Scheduler
- Remote access
- Review patient files



Waterfall/Trendgraph Window

Displays:

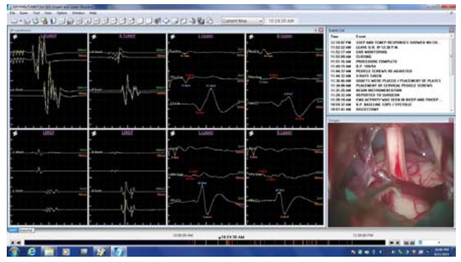
- Baseline, current and previous EP waveforms
- Graph of measurement data
- EEG data in CSA or DSA graphs
- Current display or look-back mode
- Ability to hide unwanted waveforms
- Linear graph of measurement data (latency, amplitudes, frequency, etc.)
- Event page
- Numeric values of measurement data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



Event Window

Displays:

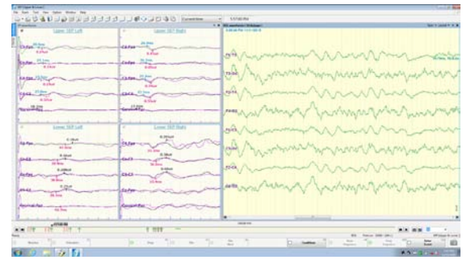
- Time and comments
- 50 preprogrammed events
- Free text on the fly
- Capture patient image with inputting events



EP Window

Displays:

- Up to 32 EP waveforms in 16 displays 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, avg/rej counts, intensity
- Step back feature allows removal of noisy average
- Live video display from microscope, second monitor or camera
- Snap shot saves one frame of patient image as a JPEG file



EEG Window

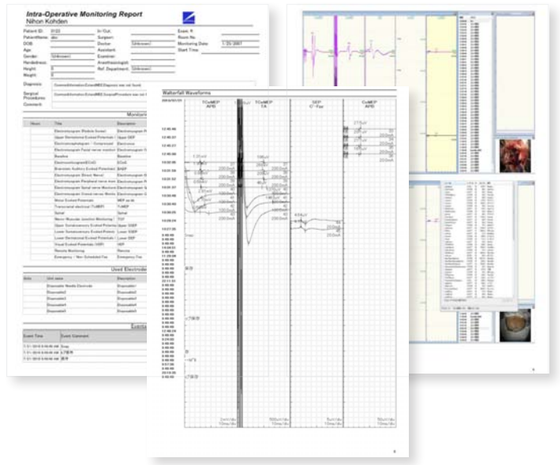
Displays:

- 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

Free Run (EMG) Window

Displays:

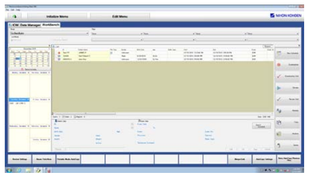
- Up to 32 waveforms
- Turn on or off waveforms from window
- Store continuously or periodically
- Layout in monitoring, stack or side by side for easy comparison
- Stimulation is available



NeuroReport™

- Create an itemized report using screenshots taken during the case
- Print event list, trendgraphs, EEG, EMG or waterfall waveforms and numeric
- Store as a file tied to the patient database node, which helps eliminate the need for paper

Flexible Software Innovation



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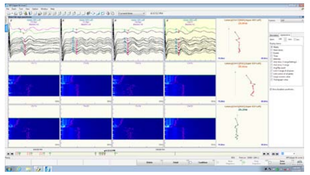

Waterfall/Trendgraph Window

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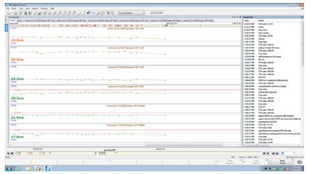

Event Window

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Specifications

Amplifiers

Number of channels:
JB-232B: 32

Maximum number of connectable breakout boxes (maximum total of input jacks):
JB-232B: 4 (64)

Input impedance:
>100 MΩ (differential mode)

Noise:
4.5 μVpp (0.6μVrms) or less at 1 Hz to 3 kHz

Common mode rejection ratio:
>= 106 dB (balance mode)
>= 112 dB (isolation mode)

Sensitivity

EP/free-run waveform:
0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10, 20, 50, 100, 200, 500 μV/div, 1, 2, 5, 10, 20, 50 mV/div ±5%

EEG waveform:
5, 7, 10, 15, 20, 30, 50, 70, 100, 150, 200, 300, 500, 750, 1000, 1500, 2000, 3000, 5000, 10000 μV/div ±5%

Low-cut Filter

EP/free-run waveform:
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 (±20%)

EEG waveform:
0.08, 0.16, 0.27, 0.53, 1.6, 5.3, 53, 159 Hz at 6 dB/oct (±20%)

Time constant:
0.001, 0.003, 0.03, 0.1, 0.3, 0.6, 1, 2 s

High-cut Filter

EP/free-run waveform:
10, 20, 50, 100, 200, 500 Hz, 1, 1.5, 2, 3 kHz at 12 dB/oct (±20%), off

EEG waveform:
15, 30, 35, 60, 70, 120, 300 Hz at 12 dB/oct (±20%)

AC interference notch filter:
50 or 60 Hz (rejection ratio: < 1/20)

Amplitude calibration:
1 div (within ±5%)

Skin-electrode contact impedance check:
2, 5, 10, 20, 50, 100, 200, kΩ indication (within ±20%)

Electrode offset tolerance:
>±950 mV

Dimensions and Weight

Main unit, DC-200B:
400 (W) × 63 (H) × 315 (D) mm, 4.0 kg

Amp unit, JB-232B:
250 (W) × 190 (H) × 75 (D) mm, 2.0 kg

Breakout box, JB-210B:
47 (W) × 153 (H) × 30 (D) mm, 0.15 kg

Stimulation pod, JS-201B:
80 (W) × 189 (H) × 30 (D) mm, 0.3 kg

TcMEP switch box, JS-210B:
154 (W) × 153 (H) × 30 (D) mm, 1.3 kg

Power Requirements

Line voltage:
100 to 240 V AC ±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)

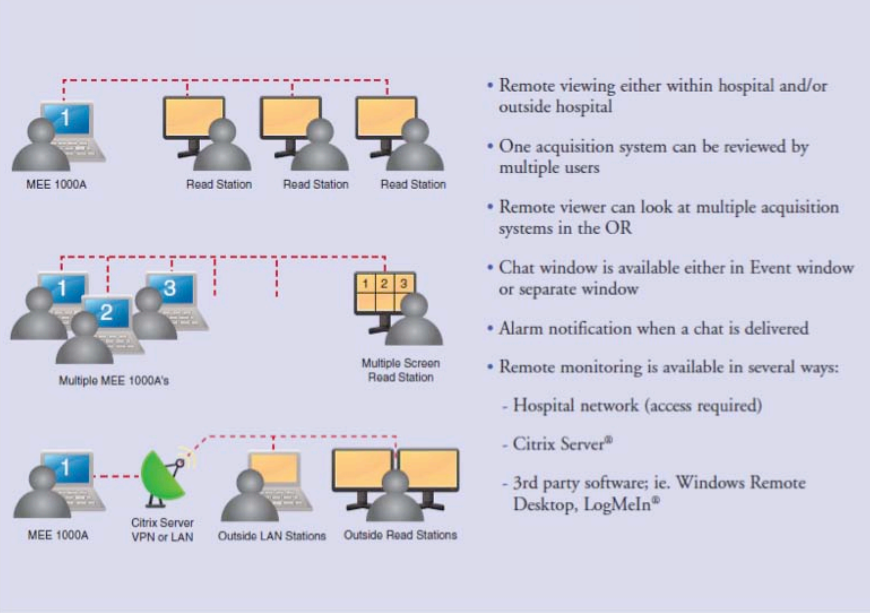
Transporting humidity:
10 to 95%

Transporting atmospheric pressure:
700 to 1060 hPa

Workflow Solutions

NeuroWorkbench® is the core integrator of the Nihon Kohden neurology product portfolio. This common interface allows for examination scheduling, protocol administration and data management that improve workflow. NeuroWorkbench provides HIPAA Compliant access to clinical data and records with passwords and various levels of administrative rights, as well as audit trails. A flexible NeuroWorkbench option includes an HL7 interface to read and write to your facilities EMR. The NeuroWorkbench SQL Database integrates all of the Nihon Kohden neurology devices to provide a complete database across all neuro-diagnostic and -monitoring modalities.

Remote Monitoring



Remote monitoring alternatives:

Using Nihon Kohden remote software, the remote viewer display is totally independent of the acquisition screen. The remote viewer can look at trendgraphs, waterfall waveforms or previous data/ numeric's without affecting the acquisition screen.

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