

Neuropack S1

EMG/EP Measuring System

MEB-9400K



Fighting Disease with Electronics

 **NIHON KOHDEN**

More Quickly

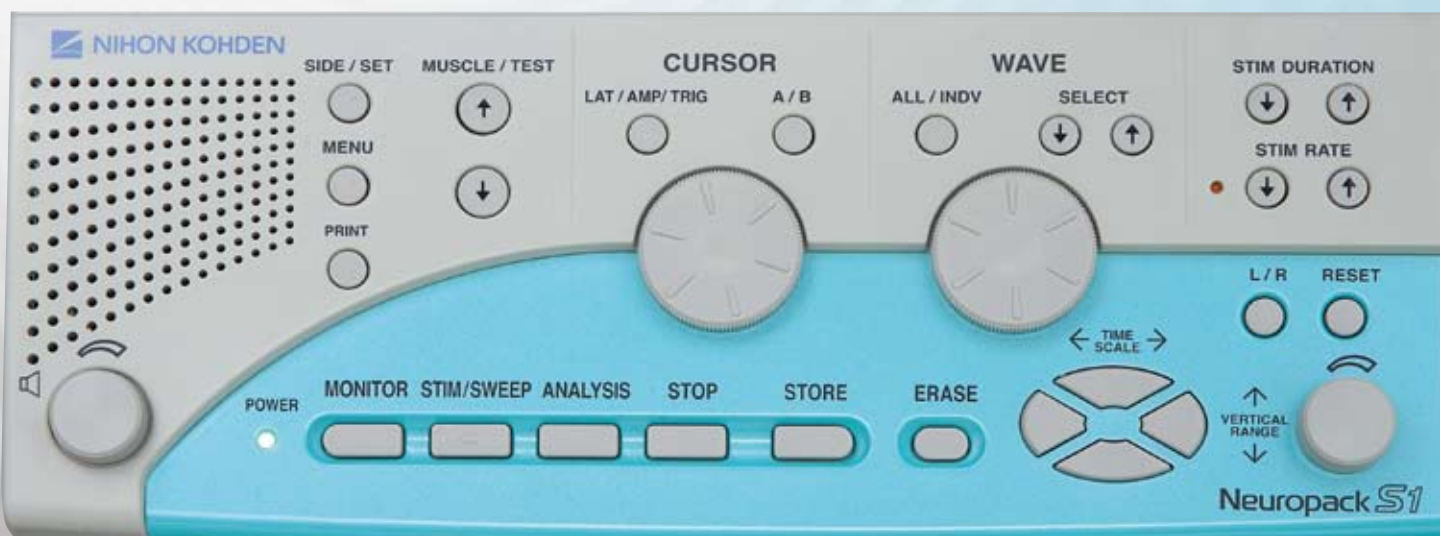
More Simply





Since 1951, Nihon Kohden has been a leader in neurophysiology and has set a number of industry standards. Our original approach and over 50 years of experience has allowed Nihon Kohden to provide the highest quality medical instruments.

Nihon Kohden's Neuropack MEB-9400 desktop and laptop systems are state-of-the-art EMG/EP instruments with auto MUP detection, auto turns/amp analysis, NCS program, report output function with Microsoft® Excel and Microsoft® Word, and 2/4 channel compact low noise amplifier on Microsoft® Windows® operating system.

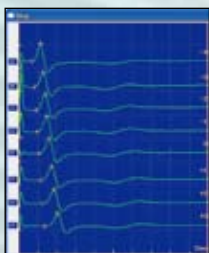
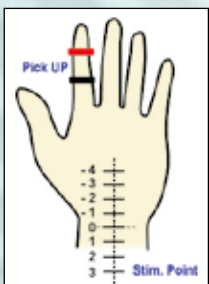


Quick Examination

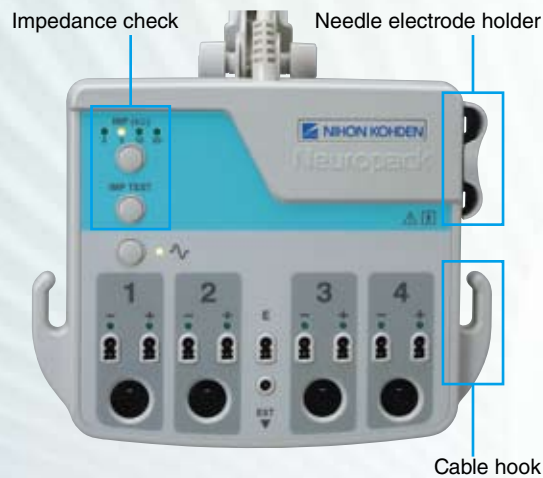
Innovative hardware and software shorten the examination time

Low noise, compact amplifier

The low noise amplifier speeds up the examination by giving you clean waveforms easily and quickly. You can optionally configure it with amplifiers from 2 channel (JB-942BK) or 4 channel (JB-944BK).



4 channel, JB-944BK



Median nerve inching measurement with low noise amplifier.



User-friendly control panel

The simple and easy-to-use control panel allows smooth examination. You can change the electric stimulation duration and rate with easy, one-touch operation.

Select the measurement side in EMG and NCS program

Select the electric stimulation duration and rate



RESET key
Set the stimulation intensity to zero



User-friendly operation menu

You can arrange the settings of the Quick menu window according to your own operation procedure.

You can directly open the examination program, saved data, edit program, operation manual and examination guide from the Quick menu.



Extensive built-in help

The Neuropack Navigator on-screen examination guide shows examination information, electrode, stimulation positions for NCS and other examinations.

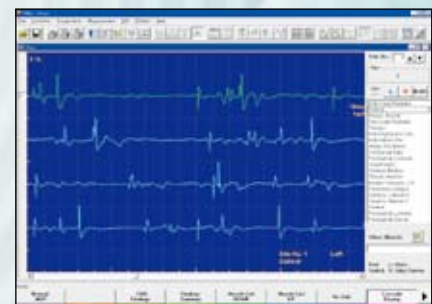
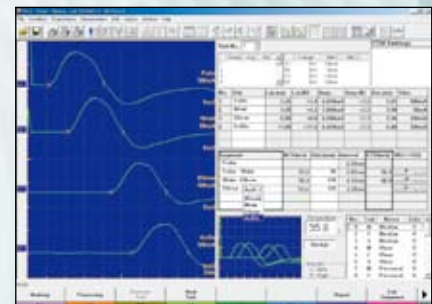


Onscreen operation manuals are also available. You can refer to Neuropack Navigator and operation manuals anytime.



Innovative software

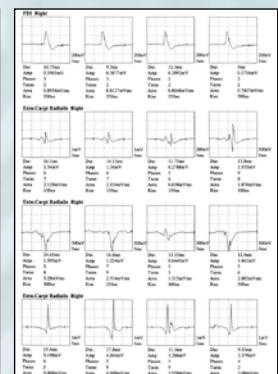
Quick EMG and Quick NCS programs provide the fastest examination possible. Basic protocols, including EMG, NCS and somatosensory, auditory, and visual evoked potential software are provided as standard. Optional software packages are available for other examinations.



Flexible reports generation

Three types of report can be generated by just clicking the report button.

- Output to Microsoft® Excel/Microsoft® Word
- Printout of waveforms on the screen
- Waveforms, data and information on one page



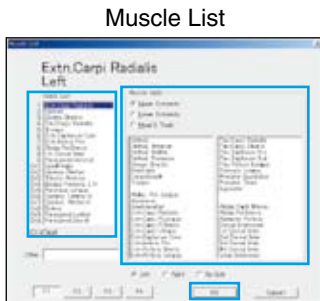
EMG

Routine EMG Examination Program, EMG2

EMG2 is the first routine program to utilize auto MUP detection and classification, and real time turns/amp analysis. A more functional and sophisticated EMG findings screen in EMG2 meets various needs in clinical use by easy and smooth operation.

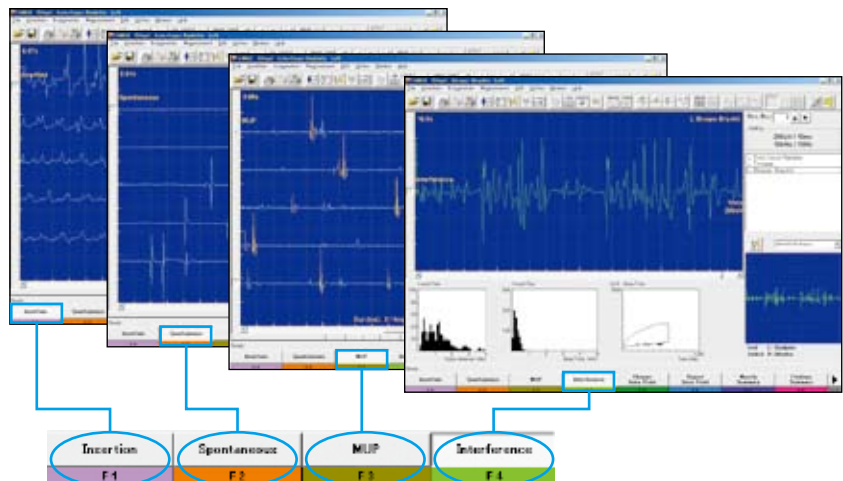
Quick Operation

The Muscle List appears when the program starts. Main muscles are displayed in the Quick List box and you can select the muscle by clicking or pressing the number on the left side of the box with the number key.



Quick Display

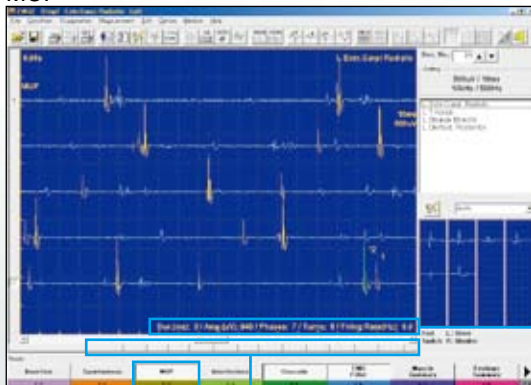
You can easily choose from 4 measurement modes - Insertion, Spontaneous, MUP, or Interference - by clicking a function key at the bottom of the screen.



MUP

MUP waveforms are automatically detected and classified into MUP groups. MUP measurement result (Duration, Amplitude, Phase, Turns and Firing Rate) are also shown on the screen.

MUP

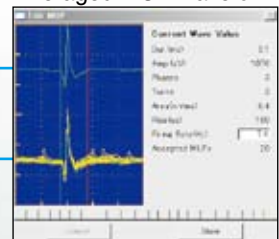


Firing Pattern of Selected MUP

Measurement results

The averaged MUP of the same MUP groups are calculated and displayed with the numeric data. You can change the duration (beginning and ending point) while reviewing the superimposed MUP waveforms.

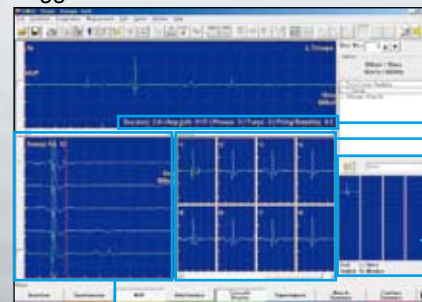
Averaged MUP waveform



Averaged MUP waveforms

Superimposed MUP waveforms

Trigger MUP



Cascading waveforms window

Measurement results

MUP sweep window

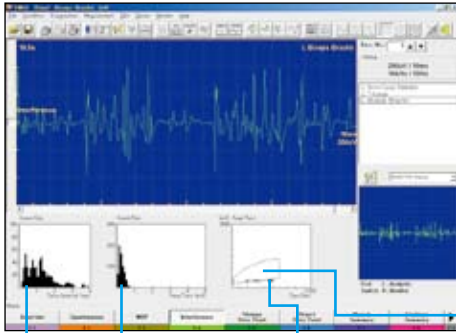
MUPs window

A cascading waveforms window displays the waveforms which exceed the trigger level in chronological order. You can change the duration (beginning and ending point). Up to new 8 sequential MUP waveforms are displayed on the MUP sweep window.

You can easily select the waveforms by just pressing the numeric keypad for saving it in MUPs window.

Interference

Interference window



Turns/amp measurement is automatically performed in Interference mode. The measurement result at every one second is displayed on the Turns-interval histogram, turns/amp histogram and turns/amp graph.

The turns/amp normative data of Biceps Brachii, Extensor Digitorum Communis, Quadriceps and Tibialis Anterior muscle are installed as default settings and its normative area is displayed in the turns/amp histogram. You can easily recognize whether or not the measuring waveforms are in the normative range.

Normative data area

Amp/Turn histogram Amp/Turn graph

Turns-Interval histogram

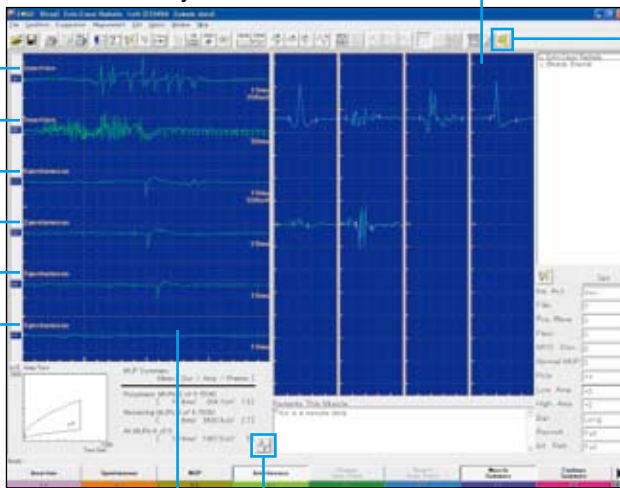
The latest measurement result is displayed in a red circle.

Muscle Summary

Measurement results and saved waveforms can be displayed in the Muscle summary window.

The latest EMG findings screen shows 26 traces of waveforms with annotations in the MONITOR Waves window and up to 20 MUP waveforms in the MUP window on one screen for efficient and quick EMG findings.

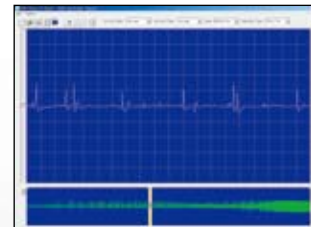
Muscle Summary Window



MUPs window

EMG Player button

You can also easily review acquired waveforms with sound after measurement by clicking the EMG player button.



Annotation

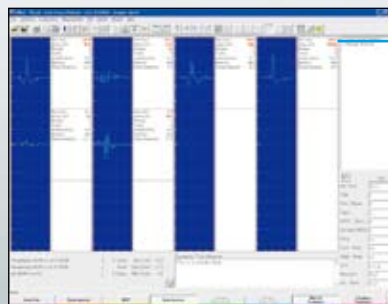
MONITOR Waves window

MUP details button

You can see detailed information of MUPs by just clicking the MUP button on this screen.



MUP detailed window

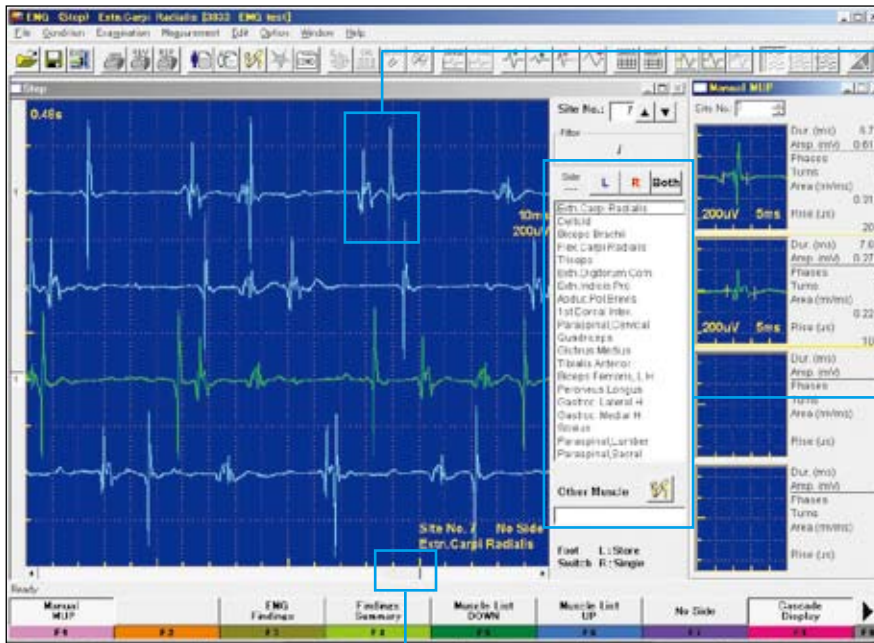


Measurement data that is outside the normative range is displayed in red.

EMG

Routine EMG Examination Program

Up to 99 sites of continuous 600 second EMG waveforms can be stored on the hard disk and reviewed. Quick MUP analysis, muscle and site selection, and smooth scroll help in the diagnosis of needle EMG study.



Quick MUP analysis

Up to 4 selected MUP waveforms are shown in the manual MUP window with the automatically calculated data (duration, amplitude, phase, turns, area and rise time).

Quick muscle and site selection

You can easily choose the muscle and site from the muscle quick list with the SIDE/SET key and MUSCLE/TEST key on the operation panel.

Smooth scroll

You can scroll the screen with the CURSOR dial and review the waveforms continuously without opening another window.

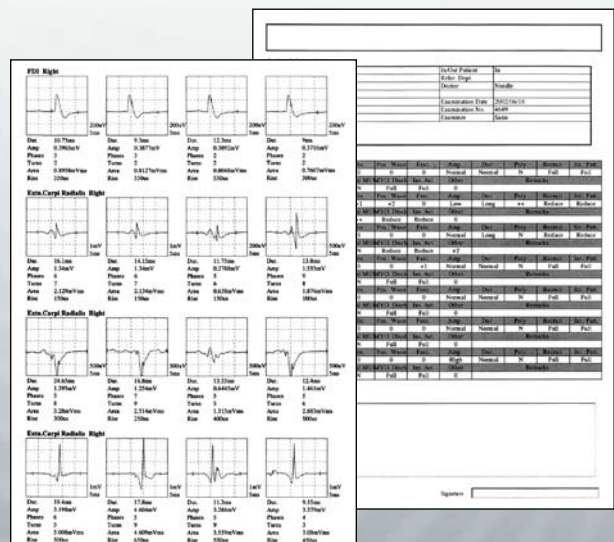
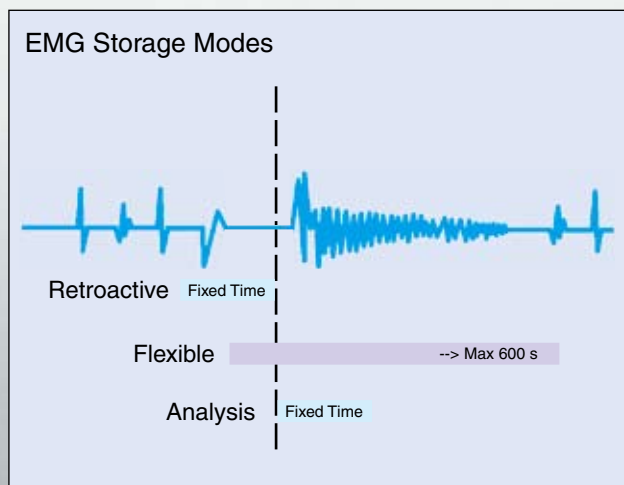
EMG storage mode

Three storage modes are available for the best fit to your storage needs.

- 1. Retrospective Mode**
Temporarily stores the waveforms from a set period before the STORE button is pressed.
- 2. Flexible Mode**
Stores the waveforms for the period from approximately 2 seconds before pressing the foot switch until the foot switch is released (600 seconds (10 minutes)).
- 3. Analysis Mode**
Stores the waveforms for a fixed period when the ANALYSIS button is pressed. This is useful for storing surface electromyogram waveforms.

Enter comments during EMG measurement

You can enter the diagnosis results in the EMG finding tables during examination and make a report with results and MUP waveforms by Microsoft Excel.



Quantitative EMG Software (QP-946BK) (Option)

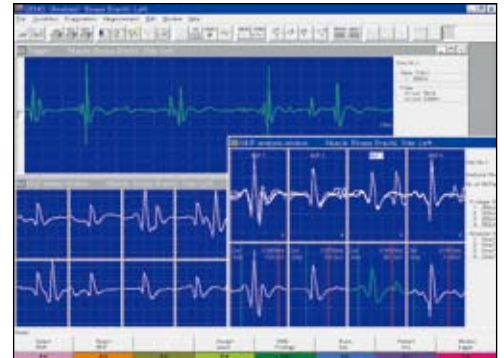
• QEMG

◆ Real-time MUAP analysis

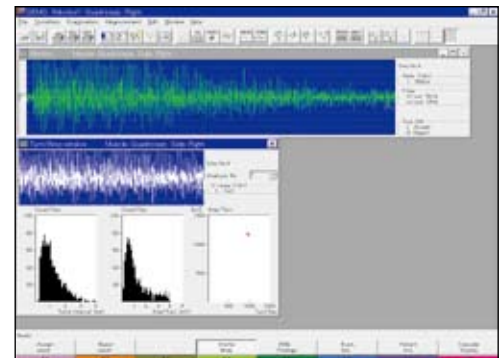
With the template matching method, MUAP are automatically classified into several patterns and the amplitude, phase, turns, area, rise time and firing rate are quantitatively analyzed in realtime. There are two methods of analysis: triggered and continuous. The analysis results can be statistically processed.

◆ Real-time interference pattern analysis

Interference patterns can be analyzed in two ways: turns/amp analysis and power spectrum analysis with FFT.



Realtime MUAP analysis screen



Interference pattern turns/amp analysis screen

Single Fiber and Macro EMG Software (QP-947BK) (Option)

• Single fiber EMG / Stimulated single fiber EMG

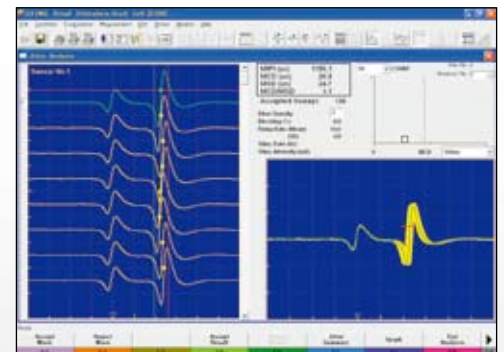
• Macro EMG

◆ Single fiber jitter analysis

Jitter reanalysis is possible at different trigger levels for all acquired waveforms. MCD, MSD, MIPI, firing rate and blocking can be automatically analyzed. Two single fiber modes are available: voluntary contraction and stimulated.

◆ Simultaneous 8 channels

Simultaneous 8 channel macro EMG recording is possible. Acquired waveforms can be reanalyzed. Triggered waveforms and averaging result can be simultaneously displayed.

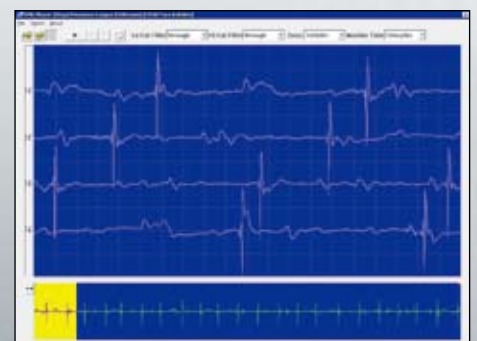


Jitter analysis screen

EMG Playback Software (QP-930B) (Option)

This Windows application lets you play back EMG files with sound on a PC for presentations and lectures.

- EMG file moving display with EMG sound, up to 300 seconds
- Sweep speed, sensitivity, and filter settings can be changed
- Maximized display at 1024 × 768 resolution
- Compressed/cascaded waveform display
- Compatible with Windows® 98/Me/NT/2000/XP



Cascade screen

NCS program for the ultimate timesaving exam

The NCS program lets you perform MCS, SCS and F wave in one program. Up to 42 examinations can be created in your own custom routine protocol by selecting nerve, site and exam. You can change the examination by just clicking the item in the list box.

The results of all examinations you performed in the NCS program are compiled in one Microsoft Excel report so you don't have to make separate reports for each examination.

User definable trace annotation

Site comments are simultaneously entered in the table and marked on the waveform.

Normative latency and amplitude data column

CCV (Compensated Conduction Velocity)

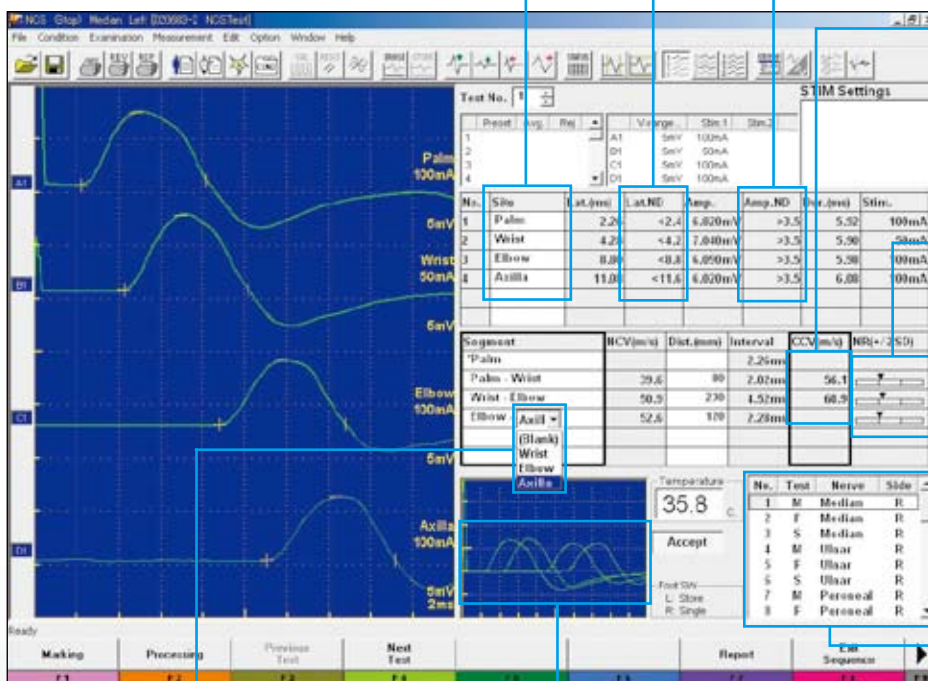
You can display NCV compensated for skin temperature.

Normative range bar graph

Measured latency is indicated on the user definable normative range bar graph. You can see at a glance if the data is inside or outside the normal range. The color of the latency mark changes when it exceeds the normal limit.

Examination list box

You can jump between exams by just clicking the item. (M: MCS, S: SCS, F: F-wave)



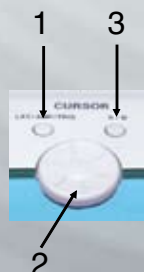
Customized segment list box

You can quickly select sites from a customized menu during examination.

Superimposed waveform display

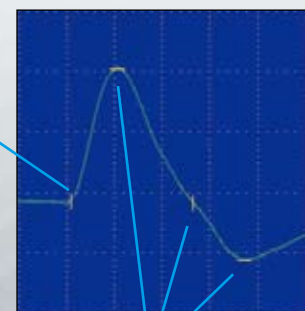
Fast marking

When you manually mark the take-off point in the NCS menu, the other marks (Peak, Bottom and Cross) are set automatically. The Fast Marking function combines the speed of auto marking and the accuracy of manual marking.



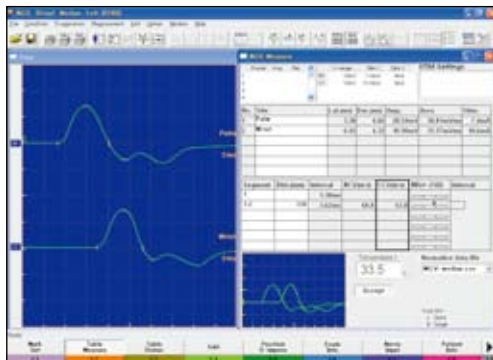
1. Press the LAT/AMP/TRIG button to start Fast Marking.
2. Move the cursor to the take-off point of the waveform.
3. Press the A/B button to set the mark.

Just set the take-off point

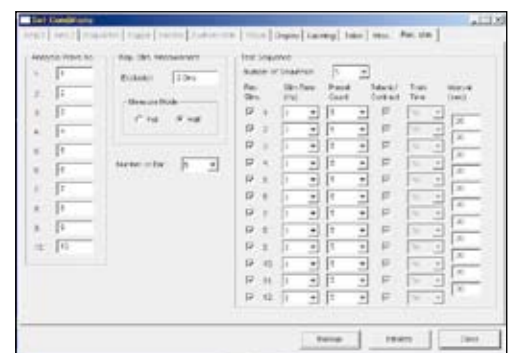
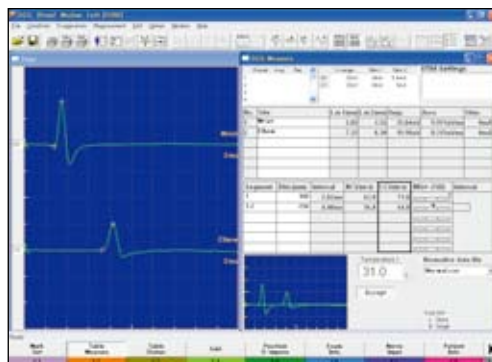
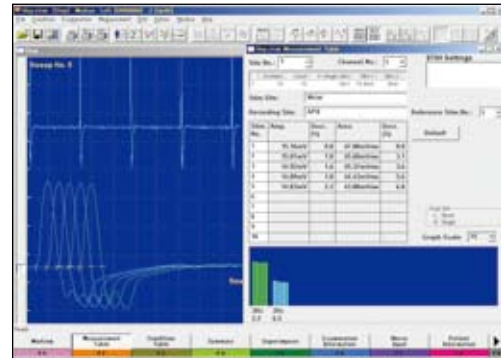


These marks are automatically set when you mark the take-off point.

◆ MCS/SCS



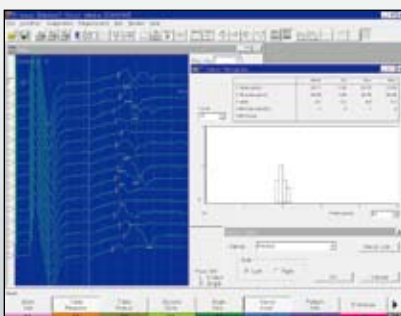
◆ Rep Stim



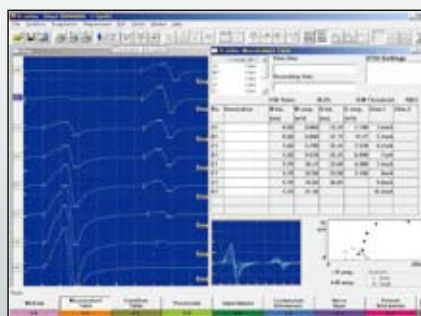
- The measured waveforms and measurement table are linked and data in the measurement table is automatically updated when you change the position of waveforms. You don't have to worry about measurement ordering.
- Normative data and condition are shown on the same screen.
- The superimposed waveform in real time is shown at the same time, so you can see the change of latency at a glance.

- The amplitude of each sequence is displayed as a bar graph on the same screen. You can see the summary of Repetitive Stimulation study at a glance. The waveform of each sequence can be displayed by clicking the corresponding bar graph.
- Up to 12 sequences of stimulation patterns can be set for one automatic measurement (Automatic sequence function).

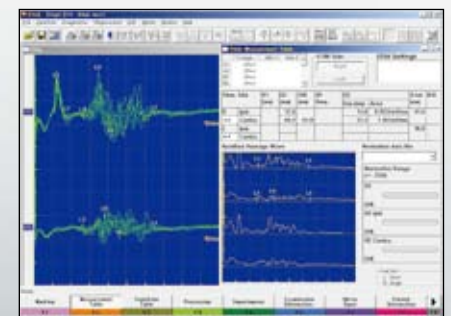
◆ F-wave



◆ H-reflex



◆ Blink reflex



- With the Dual Sensitivity function, the M wave is displayed on the left side of the window and the F wave on the right.
- F wave latency is displayed in the F wave histogram window.

- The intensity-amplitude graph and superimposed waveforms are displayed on the same window.

- The relation between the mark position and the normative range is easy to see on the Blink Measurement Table window.

SEP

Standard Examination Protocols

- SEP
- SSEP
- ECG-SSEP
- ESCP
- Electric

◆ ECG artifact-free SSEP

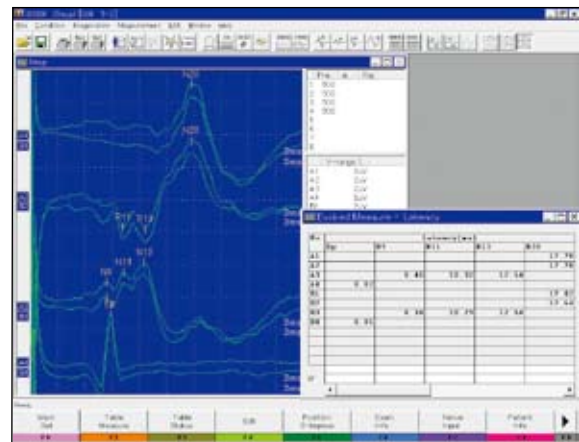
With ECG-SSEP protocol, stimulation and averaging is done during the flat period of the ECG waveform so artifact-free waveforms can be recorded.

◆ Signal triggering and back averaging

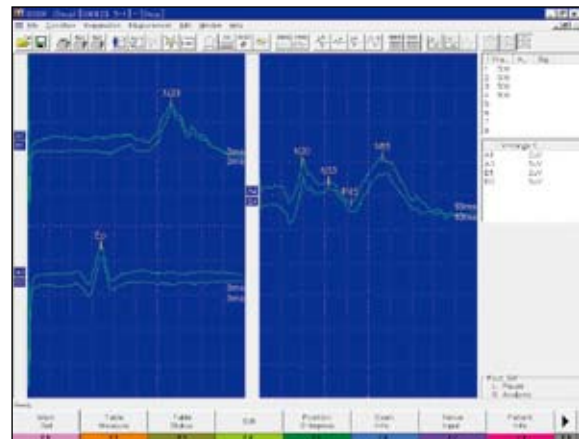
Cortical potentials prior to muscle contraction can be recorded by using a rectified EMG signal trigger and back averaging.

◆ Simultaneous SSEP and SEP measurement

Upper and lower extremity measurements can be conducted at the same time on the same screen.



SSEP screen



SEP/SSEP screen

VEP

- Pattern-VEP
- Goggle-VEP
- Flash-VEP
- ERG
- EOG
- Visual

◆ Flexible pattern stimulations

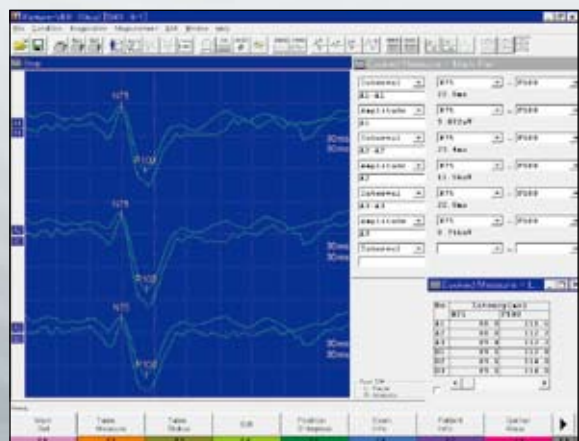
Pattern reversal stimulation can be selected from full, half, and quarter visual field. 4 to 128 horizontal divisions can be selected for patterns.

◆ Variety of visual stimulations

A monitor for pattern reversal, LED goggles and flash stimulator options allow complete visual testing.

◆ EOG velocity waveform display

With the integrated differential amplifier, the velocity waveform can be simultaneously displayed with the original EOG signal.



Pattern reversal VEP screen

Standard Examination Protocols

- ABR
- MLR
- SVR
- EcochG
- Auditory

◆ 3 types of auditory stimulation

Click, tone burst, and tone pip stimulation are available.

◆ ABR auto marking

In the ABR protocol, automatic waveform marking allows time saving measurement of latency, amplitude, and interval.

◆ Automatic separation of AP and CM waveforms

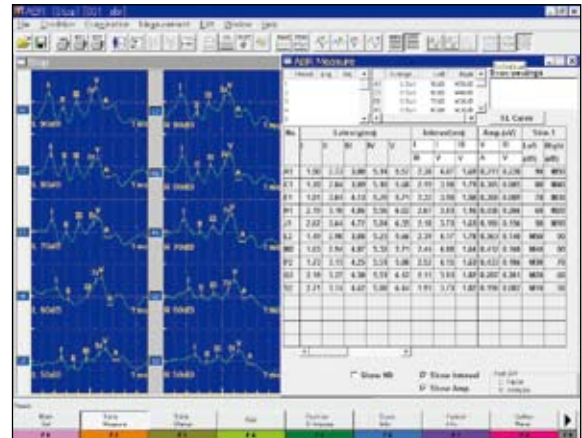
In EcochG examination, AP and CM can be automatically separated from the original waveforms in real time. The original, AP and CM waveforms are simultaneously displayed on the screen.

◆ Simultaneous ABR and MLR measurement

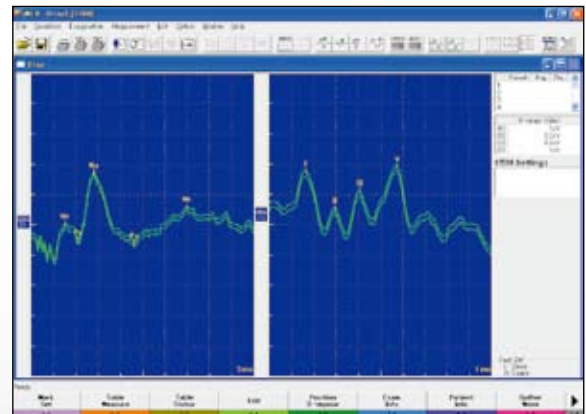
ABR and MLR can be measured simultaneously on the same screen.

◆ Flexible pattern stimulation

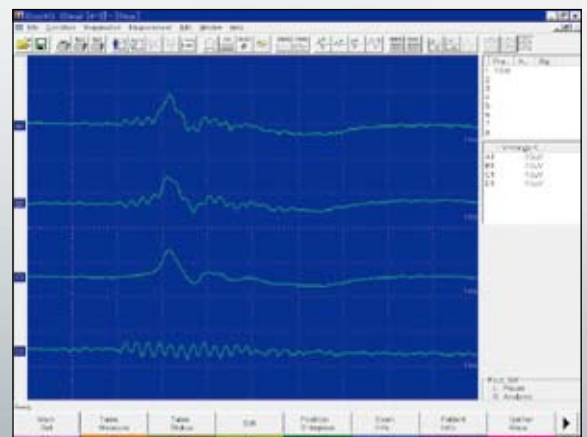
Pattern reversal stimulation can be selected from full, half, and quarter visual field. 4 to 128 horizontal divisions can be selected for patterns.



ABR screen



ABR/MLR screen



EcochG screen

Optional Programs

MUNE (Motor Unit Number Estimation) program (QP-351BK) (Option)

• MUNE

◆ Adapted multiple point stimulation method

◆ Supra-M mode

- (1) Provides Supra-M mode to measure the compound muscle action potential (CMAP) and MUP mode to measure the surface motor unit potential (MUP waveform).

◆ Large waveform acquisition capacity

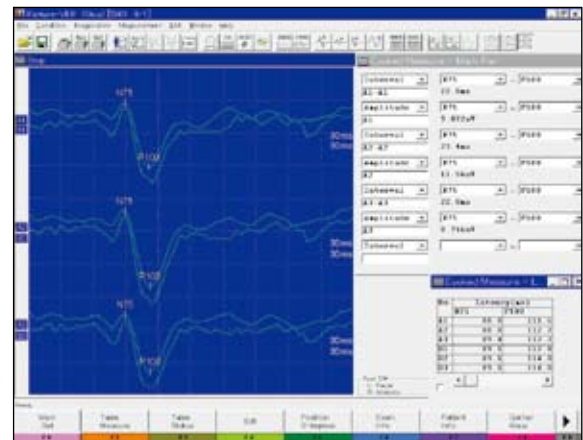
- (2) Up to 9999 sweep waveforms can be acquired in one stage. You can easily select the MUP waveforms in the Gather window to register them to the MUP window. Up to 30 MUP waveforms can be registered.

◆ MUP analysis

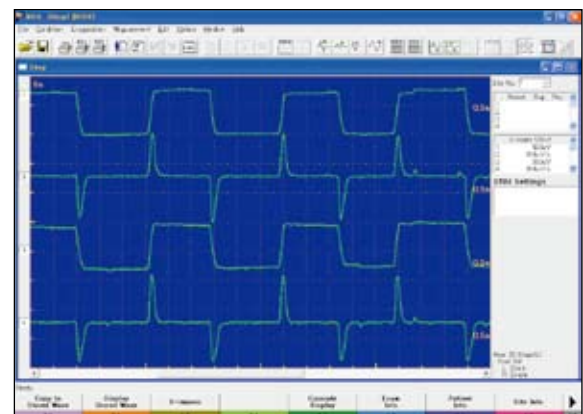
- (3) The MUP Analysis window averages the registered MUP waveforms and calculates the averaged amplitude, averaged area to estimate the number of surface motor units. Standard deviation and unbiased estimate of population variance value of the averaged MUP waveform are also calculated.

◆ Report generation

- (4) The measurement result can be printed as an Excel report.



MUP Analysis window



Gather and MUP window

Autonomic Nervous System Test

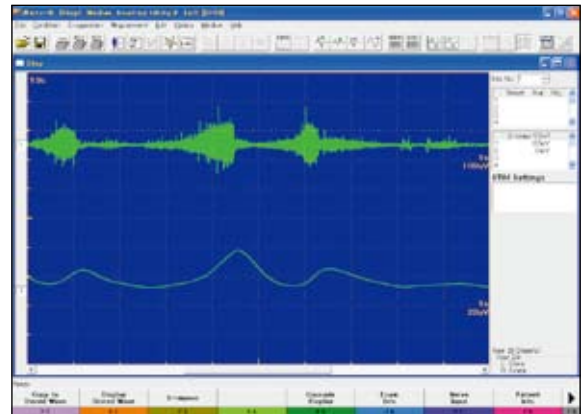
Autonomic Nervous System Test Software (QP-948BK) (Option)

- **Microneurography**
- **SSR**

◆ **Microneurogram**

A microneurogram is recorded by inserting a microelectrode directly into the sympathetic nerve.

- Up to 600 second 16 channel recording can be temporarily saved in memory.
- Waveforms can be rectified and integrated.
- External signals such as pulse wave can be recorded simultaneously.
- Evoked waveforms with electric, auditory or visual stimulation can be averaged.



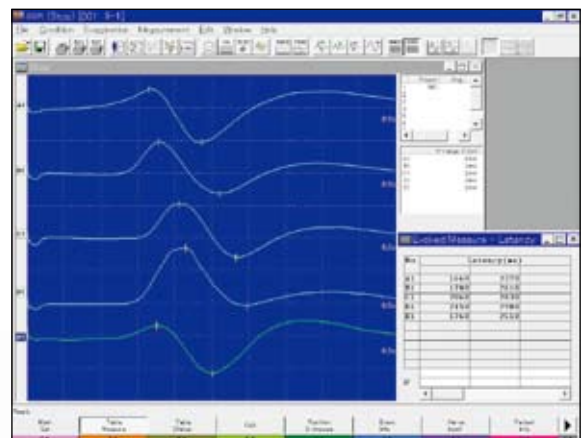
Microneurogram screen

◆ **R-R interval**

- FFT and MEM analysis
- Rejecting specific waveforms

◆ **SSR**

SSR measures potential change of the skin which is evoked by somatosensory, auditory or visual stimulation. Up to 9999 evoked waveforms can be temporarily saved in memory.

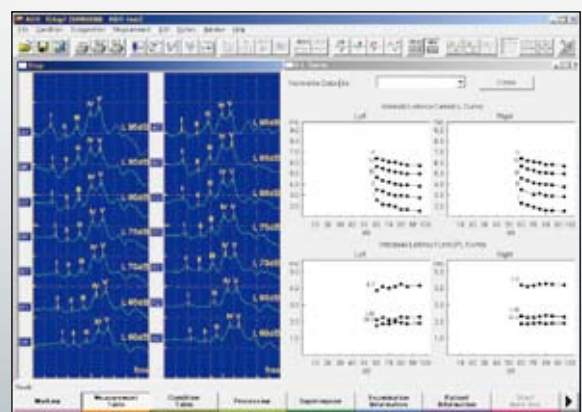


SSR screen

Review Software (QP-219BK) (Option)

You can make a review station by installing this software in a Windows PC (Windows® NT4.0/2000/XP).

- By connecting an MEB-9400 and a review station on a network, you can review and edit data in your office.
- Review data and waveforms saved on MEB-2200, MEB-4200 and MEB-5500 series instruments.
- Reaverage and save measured data.
- Print waveforms and create reports.



ABR/IL curve screen

Major Options and Related Instruments

For a full list of options and consumables, see the Technical Data separately available



Cart, KD-026A, for desktop model (photo)
Cart, KD-019A, for laptop model

EP



Headphones, adult, Y849A, child, Y849B



LED goggles, LS-102J

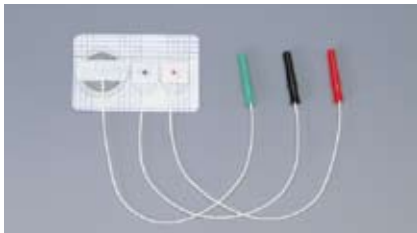


Evoked EEG electrode set, [H852A](#) NE-132B



Flash stimulator, SLS-3100

NCS



NCS disposable electrode, [H690](#) NM-317Y3



Surface stimulation electrode, felt tip, adult, [H636](#) NM-420S



Concentric needle electrode,
20 mm [H630](#) NM-121T
30 mm [H650](#) NM-131T
50 mm [H631](#) NM-151T



NCS extension cable, [K625A](#) BM-001B



Surface stimulation electrode, stainless, [H639](#) NM-422B



Extension cable, [K611](#) BM-121S



Finger electrode, [H653](#) NM-450S



SOMATO control box, RY-441B



Ground electrode, [H658](#) NM-550B

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