

## EMG/EP Workstation Technical Specifications

### Amplifiers

Amplifier Options ..... 3-, 4-, 6- or 8-channel amplifiers  
 Preamplifiers ..... Electrically isolated preamplifiers with software controlled interconnection of reference inputs

#### Amplifier # 1 - 3 or 1 - 4

..... Differential inputs with electrode cable capacitance reduction

Connector types .... 5 pin DIN connector and 1.5mm touch-proof input jacks

#### Amplifier # 4 - 6 or 4 - 8

..... Differential inputs

Connector types ..... 1.5 mm touch-proof input jacks

#### Input Impedance

Differential ..... >200 M $\Omega$

Common Mode ..... >1000 M $\Omega$ /25 pF

Noise Level ..... Typical 0.4  $\mu$ V RMS (2 Hz – 10k Hz) shorted Input

Isolation Mode Rejection ..... >160 dB

Common Mode Rejection Ratio (CMRR) ..... >124 dB

#### Sampling

ADC Resolution ..... 24 Bits

Sample Rate ..... 48 kHz per amplifier

#### Lower Frequency Limits (-3dB)

Programmable ..... 0.01 Hz – 3 kHz (16 steps)

#### Upper Frequency Limits (-3dB)

Programmable ..... 20 Hz – 13 kHz (12 steps)

Sensitivity ..... 0.5  $\mu$ V/D – 20 mV/D (19 steps)

Display Sensitivity ..... 0.05  $\mu$ V/D – 20 mV/D (23 steps)

Impedance Test of Electrodes ..... 0.1 k $\Omega$  – 1 M $\Omega$

#### For 4-, 6-, and 8-channel Amplifier Options

..... Impedance indicators for each input pin and patient ground

### Acquisition

Sweep Speeds ..... 0.1 ms/D – 16 s/D (33 steps, Program dependent)

Delay Line ..... -2000 ms ->+ 500 ms (Test type dependent)

EMG Event Recording ..... Maximum 15 minutes per epoch



### Averager

Epochs ..... Autostop at maximum 100,000 per Averager

Points Per Channel ..... Up to 4800, Program dependent

### Timing

#### Trigger Mode

Stimulation Trigger ..... manual, repetitive or external

Repetition Rate ..... 0.1 – 200 Hz

Extended set-ups with Pulse, Paired Pulse and Trains.

All with user-definable configuration at fixed or random frequency.

Dual stimulation with simultaneous or alternate mode.

EMG trigger ..... signal and free run

#### Stimulation Train

Number of pulses ..... 1 – 1000

Frequency ..... 0.1 – 200 Hz

#### External Trigger Input

Pulse Form ..... 5 V TTL-level, negative going, duration minimum 21  $\mu$ s

Stimulus Delay ..... 2.5 ms

#### External Trigger Output

Pulse Form ..... 5 V TTL-level, negative going, duration minimum 10  $\mu$ s

### Electrical Stimulator

#### Single Constant Current Stimulator

#### Optional Dual Constant Current Stimulator

Output Range ..... 0 – 100 mA (software controlled)

Intensity Resolution ..... 0.1/0.02 mA

Source Voltage ..... 400 V

Output Resistance ..... >5 M $\Omega$

Stimulus Duration ..... 20  $\mu$ s – 1 ms (9 steps)

#### Safety Features

Power Limitation ..... Maximum mean power: 0.5 W

### Visual Stimulator

Pattern Type ..... Checkerboard, horizontal bars, vertical bars

Sizes ..... 3 x 4, 6 x 8, 12 x 16, 24 x 32, 48 x 64, 96 x 128

Field Format ..... Full, left half, right half, upper right, lower right,

..... upper left, lower left

Stimulus Type ..... Onset, reversal, goggles

Fix Point ..... 4 types, movable

Background ..... Black, grey

### Auditory Stimulator

Stimulus Shapes ..... Clicks, Tone burst, Pips, Half Sine, Full Sine

Tone Burst ..... 0 – 120 dB peSPL depending on signal frequency

Click ..... 0 – 132 dB peSPL

Click Duration ..... 50 or 100  $\mu$ s

#### Max. Intensity

Software dependent ..... 132 dB peSPL (1.0 dB Steps)

Masking ..... White, low pass, high pass, band stop filtered

Masking Level ..... 15 – 99 dB peSPL

Headset ..... Calibration data is stored in headset

Calibration ..... peSPL or NHL (software controlled)

## Typical Computer Performance

Core i5-7500T  
8 GB RAM  
256 GB SSD  
Windows 10 Pro, 64-bit  
22" and 24" LCD monitor option

## Patient Safety

Isolation between mains and patient-applied parts >4 kV  
Complies with IEC 60601-1, type BF specifications

## Power Supply

Mains Voltage ..... 100 – 240 V ~ 50/60 Hz  
Power Consumption, includes Isolated Power Outputs .....Max 300 VA  
Isolated Power Outlets 100 – 120 V ~ max 7.4 A, 200 – 240 V ~ max 3.7 A  
Patient Safety.....Isolation between mains and patient-applied parts >4 kV

## Mechanical Data

Total Height ..... 1180 – 1310 mm (floor to top of display)  
Width .....610 mm  
Depth .....550 mm  
Weight ..... 35 kg (cart system includes arm and amplifier)

## Environmental Limits

### Operating

Temperature.....+10° to +35° C  
Relative Humidity ..... 20% to 80% (non-condensing)  
Altitude ..... -15 m to 3000 m

### Storage

Temperature.....-40° to +65° C  
Relative Humidity ..... 20% to 80% (non-condensing)  
Altitude ..... -15 m to 10600 m