Medical Devices for Sleep Diagnostics and Therapy

SOMNOmedics

NEW! Built-in Data Transmitter

SOMNOscreen™ plus

Polysomnography according to AASM

- UP TO 58 CHANNELS
- AMBULATORY & STATIONARY
- CONTINUOUS SYST/DIAST BLOOD PRESSURE
- CONTINUOUS IMPEDANCE RECORDING
- TELEMETRY DATA TRANSFER IN REALTIME

From a Screener to a full PSG System in the palm of your hand

- upgradeable at any time!

- Fully Portable Polysomnography System
- Unlimited Mobility for the Patient and Sleep Practitioner
- Wireless Online Data Transmission of all Signals to the PC
- Wireless Synchronisation of Digital IR-Video and Audio-Recording

SOMNO medics

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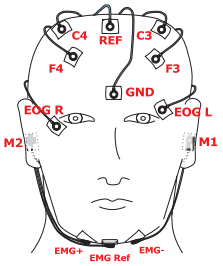
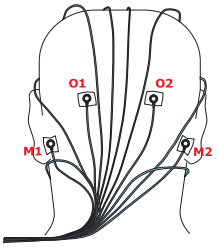
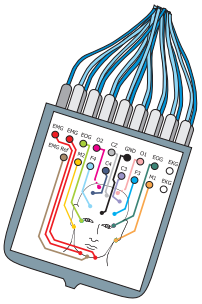
SOMNOmedics

Medical technology today needs to react to the knowledge gained from medical research in order to meet the requirements of medical practitioners and patients. Equipment development needs to react quickly to technological advances in sleep medicine.
We, the SOMNOmedics team have accepted this challenge and through the use of these new technologies have developed an innovative solution for sleep diagnostics and therapy which will offer you the practitioner as well as the patient a flexible and reliable, easy to use system in the sleep laboratory, patients home or anywhere else.







SOMNOscreen™ plus

Miniaturization - SOMNOscreen™ *plus*, is currently the smallest full Polysomnography system available today. Featuring up to 58-channels of Polysomnoghraphic data, the palm sized unit can store the data on a Compact Flash card and simultaneously transmit the data to a PC via the built-in data transmitter.

Mobility - Sleep studies should be performed where it is most suitable for the sleep practitioner and the patient.

Mobility for the Patient - It should be possible to measure sleep data in the patient's normal sleeping environment at home, maintaining their normal routine. To avoid panic attacks, the patient should not be tied to the bed with electrodes and cables.
With the SOMNOscreen™ *plus*, the patient is free to move around and even go to the toilet. The unit, electrodes and cables are all worn on the patient.

Mobility for the Practitioner - Hospital stays are expensive. Staff, accommodation, meals, etc. all add to the high cost of a sleep study. With the SOMNOscreen™ *plus*, even video can be recorded outside the sleep laboratory with the mobile digital video unit, which includes video and audio recording with a built-in infrared light source and radio transmitter.

Flexibility of Equipment Choice - You decide which configuration to start with. SOMNOscreen™ *plus* is available in a variety of configurations from a simple screener to a full sleep laboratory system with telemetric video. With the SOMNOscreen™ *plus*, you also take advantage of any new developments that occur in software and hardware up-grades.

Flexibility in Measurement - The specific parameters you wish to measure can be defined individually.

Flexibility in Application - Basic respiratory screening, CPAP/BiPAP/SV Titration, full PSG recording with or without Video, 24 hour ambulatory EEG recording, stationary EEG-monitoring with video control or 24 hour ECG and pulse oximetry recording - the choice is yours!

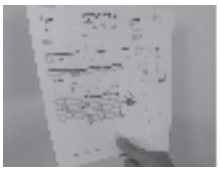
Flexibility in Diagnostics - Special analysis templates are available based on original R&K, the AASM criteria or user defined for special research configurations.

Technical Features

- Miniaturized, portable unit - **worn entirely on the patient**
- **Up to 58 channels** - 8 channels integrated in main unit
- Modular design **upgradeable** at any time
- Data recorded at 16 Bit
- Adjustable s**ampling rate up to 512/s** (optional 4096/s)
- Display with control keys allows **PC independent set-up and operation**
- Signal check on display or at the patient's bedside on a tablet PC.
- Li-Ion battery without memory effect. Provides 33 hours of continuous recording of a full PSG study
- Data storage on high speed Compact Flash card with up to **2 GB** capacity or up to **100 hours** of PSG recording time

Wireless Online Data Transfer to the PC
The built-in data transmitter sends the recorded data to the PC via LAN-receiver. All signals can be checked parallel at the patient's bedside on a tablet PC.

Wireless synchronisation of Video and Sound
Video and sound signals are recorded with the compact IR camera and IR light source and transferred to the PC synchronously. A high compression level helps to limit the amout of data.



Sensors

SOMNOmedics developed a new generation of active sensors for the SOMNOscreen™ *plus*. These sensors provide excellent signal quality, are less susceptible to failure and will therefore last a long time.

All sensors are silicone embedded. They are comfortable to wear for the patient while remaining mechanically robust and consistent. Quick and easy cleaning allows the unit to be prepared for the next patient.

For pediatric application we offer a special sensor kit.

Internal Sensors

- **Light sensor:** Determination of the relevant measurement time (TIB)
- **Movement:** Detection of movement artefacts and for sleep/wake estimation (screening)
- **Body position:** Detection of positions: left, right, supine, prone and upright

Pulse Oximeter: A high quality pulse oximeter for recording the SpO2, pulse rate and the pulse waveform. The probe is a comfortable silicone-embedded finger probe.

- **Patient marker:** For the input of relevant time points which the patient may wish to document, i.e. taking medication, etc.
- **Internal effort:** Applicable either as a thoracic or abdominal effort

External Sensors

Miniaturised Headbox PSG:
10 referential inputs for EEG/EOG + REF,
2 referential inputs for EMG/EOG,
1 differential input for ECG

Headbox EEG32:
For advanced neurological diagnostics

Thermistor:
Naso/Oral Flow

Microphone:
Snoring sound

Pressure Sensor:
For measuring the CPAP pressure from a CPAP machine, controlling CPAP during titration, flow using a nasal cannula

Effort Sensor:
Thoracic and/or abdominal effort (optional RIP)

EMG Sensors:
Recording the leg EMG for periodic leg movement analysis

EEG/EOG Combi Electrode
1 EEG / 2 EOG for simplified ambulatory sleep scoring

ECG Sensor:
Recording the ECG with an active three contact sensor for optimised signals (for screenings)

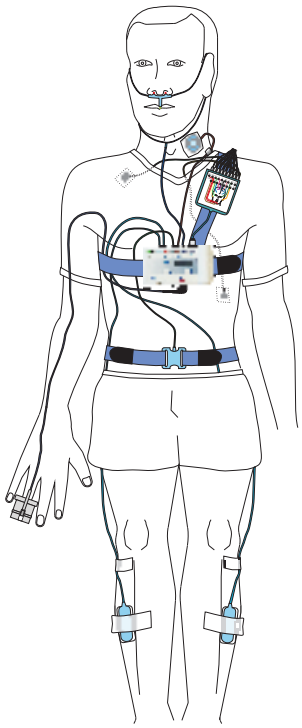
- Auxiliary: Input of an external signal

Application

The SOMNOscreen™ *plus* is fitted directly to either the abdomen or thorax.
The electrodes and cables are easily identified both by colour and mechanical coding .

The unit can be programmed to automatically start and run for a pre-programmed duration. Single and multiple measure-ments are programmable. Signals can be checked on the built-in display before recording starts!

Fast data transfer to the PC after recording: Insert Compact Flash card in the reader and you are ready to open and analyse the study within 20 seconds.
Complete automatic analysis with analysis report printout within 2-3 minutes (see reports below).



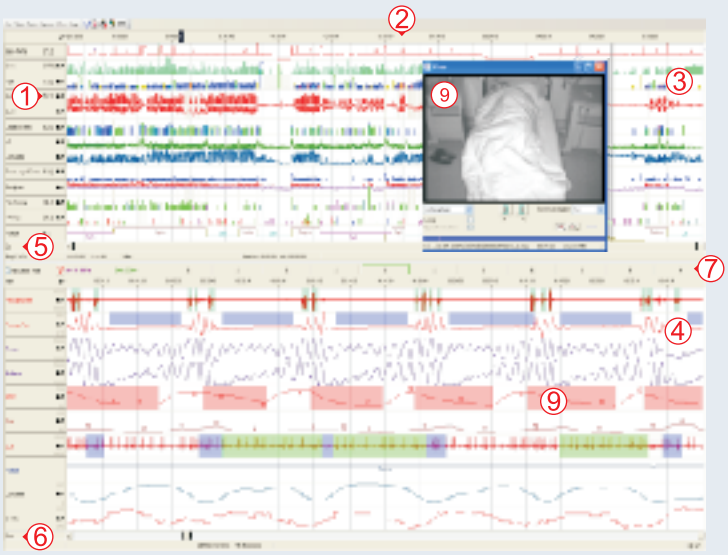
Analysis

Automatic analysis of all standard signals:

- Apnoea/Hypopnoea calculation according to type and in correlation to desaturations, Brady-/Tachycardia and micro arousals
- Micro arousal detection according to the ASDA/AASM criteria
- Brady-/Tachycardia and arrhythmia analysis
- Calculation of the average frequency value (AFV)
- Alpha + Beta and Delta frequency bands from the EEG
- Sleep staging analysis with sleep profile
- Display of the sleep staging reliability
- REM detection and analysis of REM density
- O_2 desaturations
- Body position
- Pulse Transit Time (PTT)
- Snoring
- PLM detection

New information thanks to additional analysis:

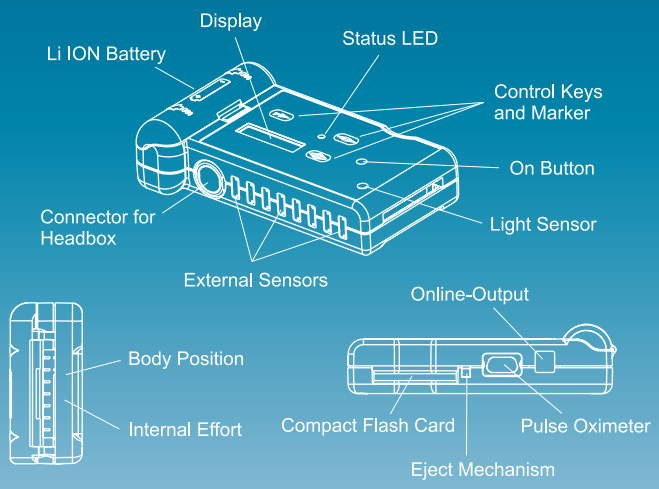
- **Sleep Fragmentation** based on micro arousal and PTT arousal analysis
- **Flow Limitation** - Obstruction level analysis*
- **Blood Pressure** - Display of the systolic and diastolic blood pressure curve* and automatic recognition and correlation of fluctuating pressure changes
- **HFV** - Heart rate variability for various frequency bands
- **FFT Module** - for the sequential analysis of the raw data
- **Interrater Variability**: Compare various analysts for quality checks



(1) Index per hour
(2) Time line
(3) Analysis channels
(4) Raw data channels
(5) Time base analysis
(6) Time base raw data
(7) Sleep stages
(8) Events
(9) Video screen

The system provides a comfortable, quick and easy means of editing the recordings. All events are colour coded and displayed in the raw data view.

* Patented, Patent Numbers DE 102005014048.3-35, EP 20060001181. 4-1526, US 11/364 174 US 2006/0217616 A1,7374542



8 - 33 CHANNELS MODULAR AND EXPANDABLE (PSG)

15 Headbox:	10 EEG/EOG referential +REF, 2 EMG referential, 1 ECG differential, GND, continuous impedance
13 External:	2x effort(RIP), snoring (microphone and nasal cannula) naso/oral flow (thermistor), motor activity, AUX, naso/oral flow (nasal cannula), PLM l, PLM r, CPAP/BiPAP pressure, blood pressure (syst./diast.)
8 Internal:	SpO2, pulse rate, pulse waveform, body position, movement, ambient light, patient marker button, effort

SENSORS

External Sensors:	Thermistor for naso/oral flow	
	Abdominal effort	
	Activity sensor (3 axis) for actigraphy or PLM	
	Active sensors for EMG/ECG	
	Microphone for snore detection	
	Combi electrode for simplified sleep scoring	
	EDA Sensor (Electro Dermal Activity)	
	NPT Sensor (Nocturnal Penile Tumescence)	
	Temperature sensor (rectal)	
	Pressure sensor (-36 to +36 cmH_2O)	naso/oral flow (cannula)
		Snore (cannula)
		CPAP-Pressure
		CPAP-Flow
		CPAP-Snore
	(-100 to +100 cmH_2O)	Oesophageal pressure

DATA PROCESSING

Active filtering

16 Bit ADC

Sampling rates adjustable from 4/s to 512/s (option 4096/s)

Small file size through compressed data storage

POWER SUPPLY

Li Ion battery (rechargeable) for up to 33 hours of ambulatory PSG and 61 hours of screening

SIZE AND WEIGHT

140 x 70 x 28 mm, 220 gr (incl. Battery)

SOFTWARE - DOMINO

Efficient analysis and scoring software

INTERACTIVE KEYBOARD AND DISPLAY

Signal check on display (blue backlit LCD display)

Programmable *Start* and *End* times

Menu controlled display

DATA STORAGE

High-speed Compact Flash card (up to 2 GB capacity)

OPTIONS

Built-in data transmitter (up to 20m) with online signal check at the patient's bedside via tablet PC

External data transmitter (up to 100m)

Video
- Synchronised video
- HD resolution
- Small file size thanks to high compression levels
- Fully synchronised with raw data and audio recording
- Playback at different frame speeds (0.25 - 100 times)
- Easy to edit, cut and archive

Software Features

Re-Analysing: Data can be re-analysed at any time

Archiving: Data can be archived to CD, DVD or a network drive, i.e. NAS (RAID-System)

Report Generator: It is possible to design different reports for different types of studies.

Form Letters: For time saving reporting and documentation

Patient Data Management (optional): A powerful patient data-base for the efficient organisation of all patient data.

- Permanent access to the complete numeric results list, sleep profiles and graphic results summary
- Trend reports
- Network-compatible patient data administration with a permanent patient list, search- and selection function

Scheduler: Calendar with scheduler function

Network link-up: GDT and HL7 interface for link-up to Practice Management Software or clinic system

Open Architecture: All results and reports can be exported to MS Excel and SPSS, raw data can be exported to EDF+ and ASCII format. EDF+ files can be imported into the software.

Configurations

	SOMNOscreen™ *plus*		
Signals and Sensors	**RC easy**	**PSG+**	**EEG 32**
Pulse oximeter (SpO2, pulse, plethysmography)	●	●	○
Patient marker	●	●	●
Ambient light	●	●	●
Body position	●	●	●
Movement (magnitude)	●	●	●
Internal effort	●	●	●
External effort	●	●	○
Pneumatic efforts	○	○	○
RIP-Efforts	○	○	○
Respiratory flow (thermistor)	○	○	○
Respiration, snore, CPAP/BiPAP pressure (pressure sensor, cannula)	●	●	○
Resp. Flow (Pneumotachograph)	○	○	○
Snoring (microphone)	○	●	○
Motoric Activity (by ACT)	○	○	○
PLM (left / right leg)	○	●	○
EEG/EOG Combi-Electrode	○**	○	○
Headbox (10EEG/EOG+2EMG+1ECG)		●	○
Headbox (25EEG/EOG+6EMG+1ECG)			●
1 channel ECG (by AUX)	○	○	○
3 channel ECG (by EXG)	○**	○	○
PH, CO2, EDA, Temp, pOesoph (individually by AUX)	○	○	○
NPT (by PLM)	○	○	○
Upgrade set 'R&K'			○
Upgrade set 'AASM'		○	○
Data transfer via cable	○	○	○
Telemetric data transfer	○	○	○
Synchronised, digital IR video	○	○	○
Ext. 8 channels (ADC-board)	○	○	○
Syst./diast. blood pressure*	○	○	○
Obstruction level*	●	●	●

Legend: ● Standard ○ Option

* Patent Numbers DE 102005014048.3-35, EP 20060001181.4-1526, US 11/364 174 US 2006/0217616 A1, 7374542.

** incl. Hardware Update

Data Transmission (optional)

- Built-in data transmitter in main unit (up to 20m):
  - Signal check at the patient's bedside
  - Data transmission from a receiver to the PC through network
- External data transmitter (up to 100m) for data transmission of up to 32 systems parallel without interferences
- Regardless of the chosen data transmission system: Backup of all measurement data on Compact Flash card, no loss of data

Video (optional)

- Infrared-Camera (resolution 640x480 px), optional with built-in data trasmitter, interkom ready
- Infrared-HD Camera (resolution 2048x1536 px), optional with built-in data trasmitter, interkom ready
- Infrared-Camera (resolution 768x576 px) with pan and zoom function, 18x optical zoom, can be Operated by remote control by every network PC

Further Options

- 3-channel-ECG
- Portable oesophageal pressure recording with balloon catheter for long-term measurements
- Miniaturized pneumotachograph for PAP flow recordings or for calibrated volume determination
- Pneumatic based effort sensors
- Long-term pH-monitor
- Rectal measurement of temperature
- Sensor for diagnosing erectile dysfunction
- Paediatric sensorkit
- Sidestream or transcutaneous capnography

LOCAL DISTRIBUTOR

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