



DR. LANGER  
M E D I C A L

Neurostimulatoriaus (skydliauks operacijoms)

## Neuromonitor AVALANCHE<sup>®</sup> XT with software s1 Thyroid VNS

### INSTRUCTIONS FOR USE

Software Version 5.0.x

Valid for devices with SN  $\geq$  AV-1300-22-2019



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# **Neuromonitor AVALANCHE<sup>®</sup> XT with SW si Thyroid VNS**

Instructions for Use

# 1 Intended use

## 1.1 Intended purpose

The neuromonitor AVALANCHE® SI Thyroid VNS is intended for localisation and monitoring of the function of motor nerves during surgical procedures. The AVALANCHE® SI Thyroid VNS is a 1-channel neuromonitor intended for intraoperative use in general and thorax surgery, ENT, oral and maxillofacial surgery. [gali buti naudojamas otolaringologijoje; Miego arterijos chirurgijoje, krutines chir. veido ir zandikauliu chir...](#)  
To trigger nerve and muscle action potentials, the neuromonitor AVALANCHE® SI Thyroid VNS comes with a stimulator for direct nerve and muscle stimulation.

[Tiesiogin intraoperacin nerv stimuliacija, elektromiografini \(EMG\) signal rašymas skydliuoks chirurgijoje](#)

## 1.2 Indication

The AVALANCHE® SI Thyroid VNS is used to localize and to monitor the function of the following motor nerves during surgical interventions:

- \* recurrent laryngeal nerve
- \* non-recurrent inferior laryngeal nerve
- \* superior laryngeal nerve
- \* vagus nerve

The intraoperative localization and monitoring of the function is achieved through electrical stimulation of the corresponding motor nerves and electromyographic measurement of the activity of the vocalis muscle. The AVALANCHE® SI Thyroid VNS processes the signals and sends them via a loudspeaker to the user and displays them visually as waveforms on the screen display.

- ✓ The AVALANCHE® SI Thyroid VNS enables switching between two stimulation outputs for intermediate stimulation of the above-mentioned motor nerves and continuous stimulation of the vagus nerve. Simultaneous activation of both stimulation types is not advisable since the triggered action potentials cause interference which would confuse the user. Therefore this is also not possible.

[Stimuliacijos kanal skaiius -2](#)

## 1.3 Contraindication

The neuromonitor AVALANCHE® SI Thyroid VNS is not intended for direct contact with the heart or the central circulatory system.

The neuromonitor AVALANCHE® SI Thyroid VNS may not be used on pregnant patients, patients with active implants, such as cardiac pacemakers or ICDs, or on epileptic patients.

**HF Mute Sensor**

BNC socket for connection of a mute sensor to suppress interference from a high-frequency surgical instrument operated simultaneously (see chapter 5.2.5).

**Network**

Connection to a network or a network printer

[Yra galimyb prisijungti prie IT tinklo](#)

**Serviceport**

Port for servicing purposes



Connection for a USB device approved by the manufacturer (e.g., printer or storage medium)

**Power input with power switch (ON/OFF) and fuse**

Power switch for putting the AVALANCHE® SI Thyroid VNS into operation. Power cord connection.



O = power OFF  
I = power ON

**ATTENTION: Observe the country-specific conditions and requirements.**

**⚠ WARNING**

**Connection of the device to mains supply and power cord without protective earth conductor**

To avoid the risk of an electric shock, the device may only be connected to mains supply and power cord with protective earth conductor.

- ➔ Only power cords with protective earth conductor approved and supplied by the manufacturer may be used.
- ➔ Observe chapter 3.2 in these instructions for use when connecting the device to the mains.

**⚠ WARNING**

**Connection of the device to a power strip**

The device is not equipped with a power strip. Connecting electrical devices to a power strip may lead to a reduced level of safety.

- ➔ Regarding this aspect, observe the requirements specified in DIN EN 60601-1 for medical electrical equipment.

## 5 Combination of AVALANCHE® SI Thyroid VNS

### 5.1 Combination with other devices

#### CAUTION

##### **Combination with other devices and EMC**

The combination with devices other than those mentioned in chapter 5 may adversely affect the electromagnetic compatibility characteristics of the device.

→ Use only the devices recommended for combination.

#### **5.1.1 Equipment trolley**

The AVALANCHE® SI Thyroid VNS can be placed on a specially designed trolley for use. Please contact the manufacturer for further information. For contact information, please refer to chapter 19 in these instructions for use.

#### **5.1.2 Printer**

An optional, external A4 printer can be connected to the Network port on the back of the AVALANCHE® SI Thyroid VNS (see chapter 3.2).

Only printers tested and approved by the manufacturer may be connected. Please contact the manufacturer for further information. For contact information, please refer to chapter 19 in these instructions for use.

#### **5.1.3 USB storage medium**

A USB storage medium can be used to transfer the A4 report as a PDF file (see chapter 7.5.3) or to replace the logo used on the report (see chapter 7.13). Only devices complying with the requirements of standards DIN EN 60601-1 and DIN EN 60950 may be connected (devices without power source).

### **5.2 Combination with accessories and other medical devices**

Accessories and combinable medical devices manufactured by Dr. Langer Medical GmbH are recommended for use with the AVALANCHE® SI Thyroid VNS. All information about connections and technical specifications of accessories and medical devices provided in this document refer to products from Dr. Langer Medical GmbH.

## 7 Software operation

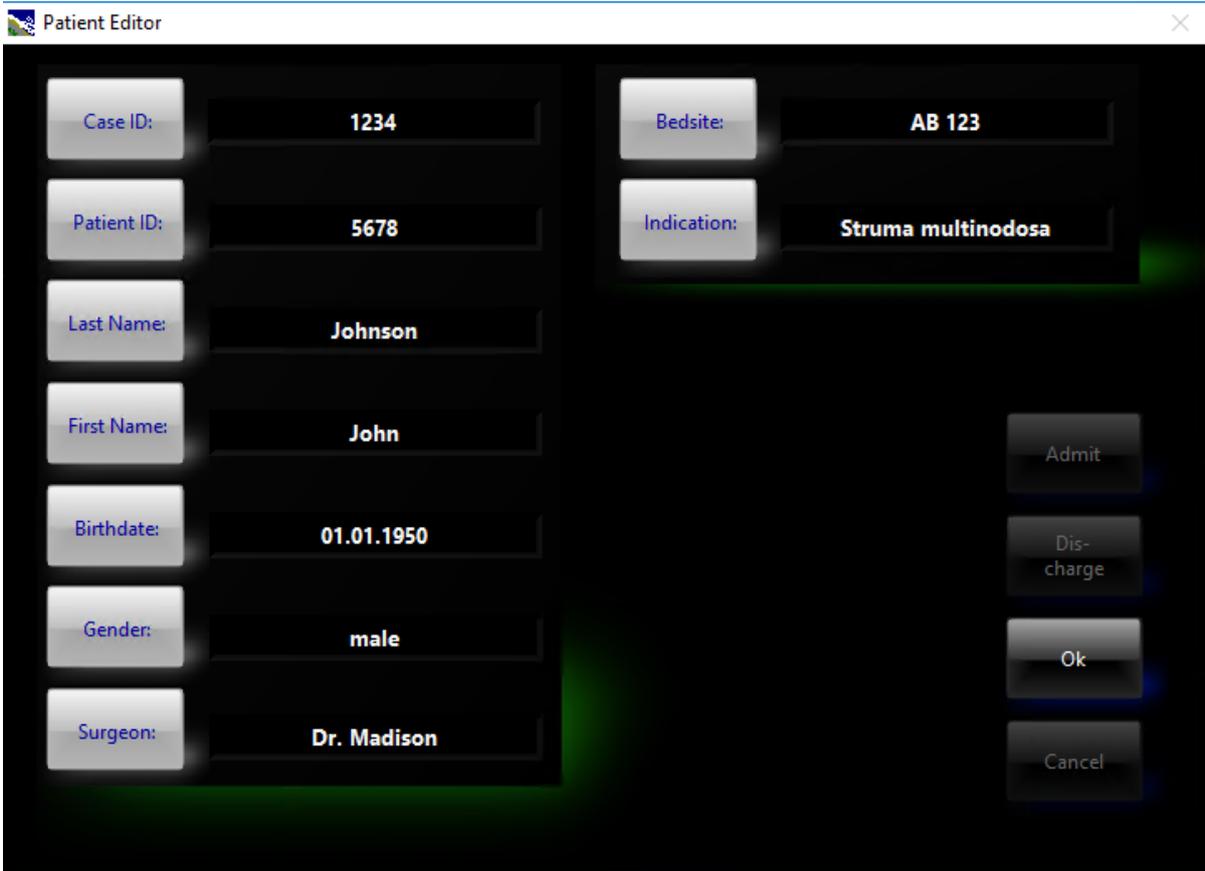
When switched on (see chapter 6.5), the AVALANCHE® SI Thyroid VNS automatically starts the software application and the patient admission window will be displayed.

If more than one software application is installed on the device, a window will be displayed where the desired application can be selected. The application is ready for use when the patient admission window is displayed.

### v 7.1 Patient admission Pacient duomenys gali buti irrašyti

Patient data can be edited any time during the measurement. If there is no time for editing the data, as in emergencies, you can press <Cancel> to close the window. You can select

the  tab button on the left side of the EMG window at any time to display the <Patient>  button and continue editing the patient data.



The screenshot shows a 'Patient Editor' window with the following fields and values:

Case ID:	1234	Bedsite:	AB 123
Patient ID:	5678	Indication:	Struma multinodosa
Last Name:	Johnson		
First Name:	John		
Birthdate:	01.01.1950		
Gender:	male		
Surgeon:	Dr. Madison		

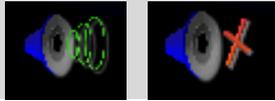
On the right side of the window, there are four buttons: Admit, Dis-charge, Ok, and Cancel.

Figure8: Patient admission window

With the buttons next to the input fields you activate the virtual keyboard; only the <Gender> field changes from "male" to "female" and vice versa without the virtual keyboard.

V

### Auto Mute



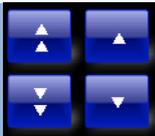
Auto Mute function switched on or off. [Garso signalu iijungimas/isjungimas.](#)

### Scale buttons



Green arrow buttons to change the scale of the Y-axis (Signal strength in  $\mu\text{V}$ )

### Stimulation parameters



Buttons for adjustment of the stimulation current intensity for the handheld probe



Buttons for adjustment of the stimulation current intensity for the vagus electrode (buttons appear in place of the blue buttons as soon as the vagus stimulation mode is activated, see chapter 7.9)

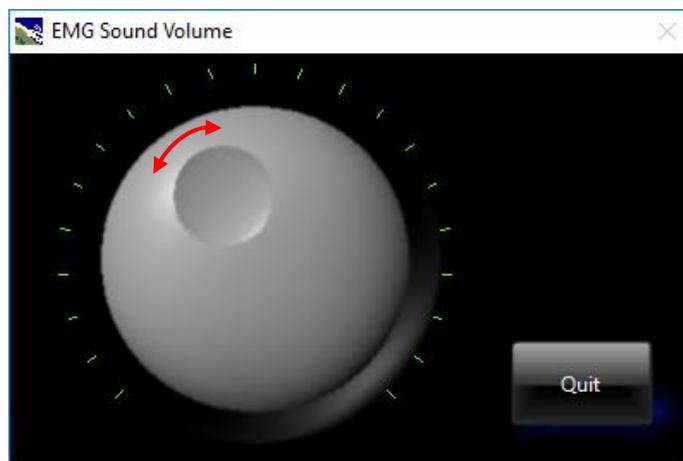
## 7.2.1 Setting the stimulation parameters

A specific stimulation current intensity can be set for each stimulation mode. The system automatically recognizes the stimulation mode, changes the colour of the buttons (blue - green) and uses the selected current intensity. You will find the buttons for adjusting the stimulation current in the EMG window at the bottom right.

not generate an audio signal. It is recommended to watch the signal traces closely to prevent false negative signal interpretation.

## V 7.4 Adjusting the EMG tone for acoustic monitoring of the EMG channel

Via the  tab button at the far right of the EMG window you access the  button to adjust the volume. [. Garso intensyvumo reguliavimas;](#)



LEFT:  
Decrease volume

Figure 20: Volume adjustment. The control knob can be used to adjust the volume.

### Notice:

#### Enabling the current confirm signal tone

- The tone is switched on when the current confirm signal is detected. If no such signal is detected during stimulation, the tone will not be switched on. The current confirm signal occurs when a functioning stimulation probe touches the tissue. It is emitted acoustically (chime) and optically (light blue or light green LED “Stimulation active” in the lower margin of the display).

## V 7.5 Data window

[Paciento duomeni ir registruojamu signal issaugojimas integruotoje duomen saugykloje;](#)

Press the tab button  on the left of the screen to display the individual menu buttons. With the <Data> button  in the EMG window, you enter the offline mode for reviewing

stored data. In the “Select Data” window, choose the data of the current case, select an old case from the database or a PDF report.



Figure 21: Selecting data

- ✓ **Current Case** Loads the data of the current operation
- ✓ **Database** Access to the database where you can choose the data of all stored operations
- ✓ **PDF Reports** Transfers the PDF reports to a USB flash drive or an SFTP server (see chapter 7.5.3)
  - [Ataskaitu suformavimas PDF formatu.](#)

### 7.5.1 Current case / Offline data window

Pressing the <Current Case> button  will open the window for display of the stored data of an examination.

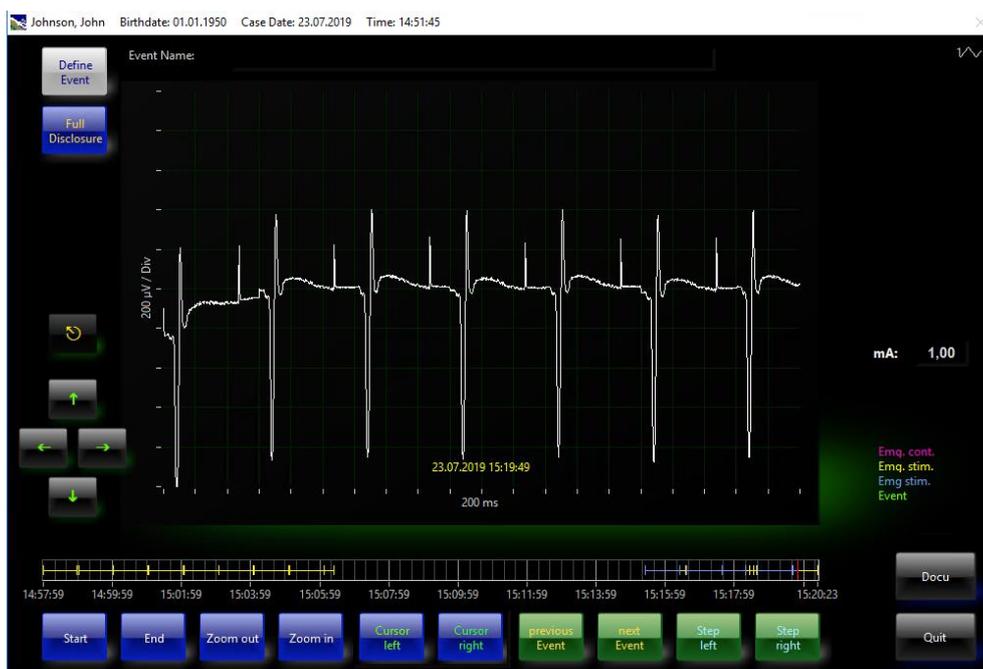


Figure 22: Window displaying the stored examination data

### 7.5.1.1 Naming of events

The stored data represented by lines in the navigation bar can be named or renamed for easier retrieval. Press the <Assign event> button . The window shown below opens where you can select a predefined event name or enter a new name. Touch the appropriate name/description in the table to transfer it to the upper text field.

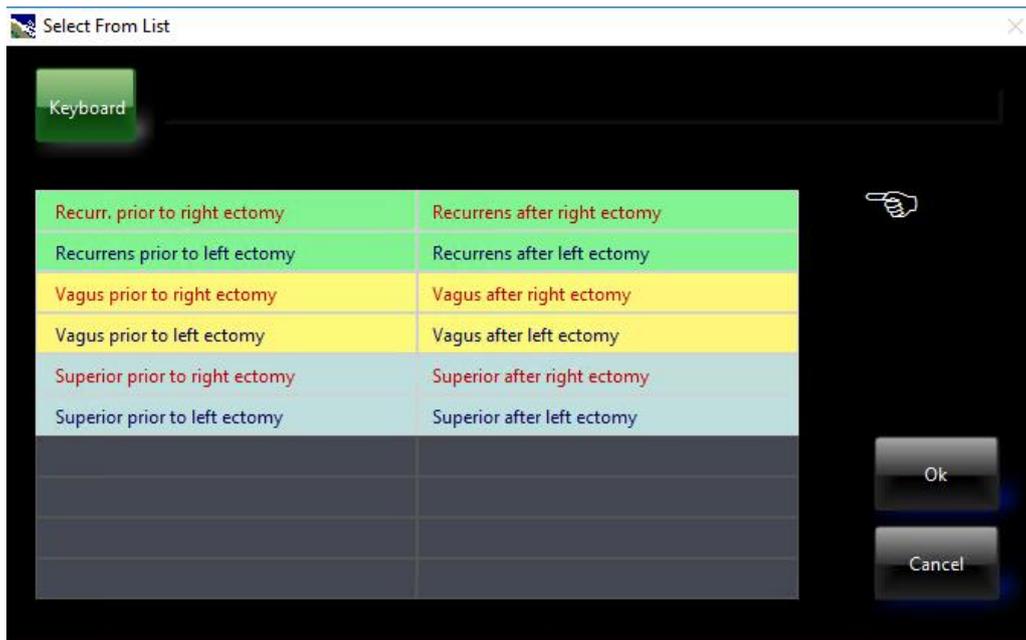


Figure 24: Comment window for print and event functions

**Ok** Select to clear the window and save the comment

**Cancel** Select to clear the window without saving the comment

**Keyboard:** Enables entry of a new comment

#### Notice:

#### Event names

- The list of predefined comments can be expanded. Please contact the manufacturer's Service team if you wish to modify the content of the existing list.

### 7.5.1.2 Printing data

An optional external A4 printer is available for printing the signal waveforms and patient information. Press the <Docu> button to print signals and patient information.

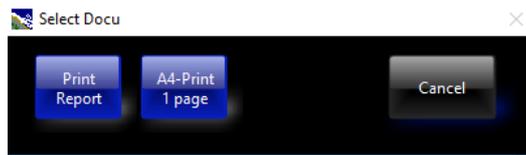


Figure 25: Documentation selection window

**Print report** Select to create and print (A4 print option required)\* a final report before the end of the operation

**A4 Print 1 page** Black-and-white printout of the current signal window, including the patient information, on an A4-size page (A4 print option required)\*

\*If the A4 print option is not available on your system, you cannot use this feature.

### 7.5.1.3 Full disclosure database functions

An additional, useful function is the "Full Disclosure" feature of the database. This format presents an overview of the evoked response signals in a 60-second time window and is particularly helpful in continuous monitoring of the recurrent laryngeal nerve for signal analysis and for locating signal changes.

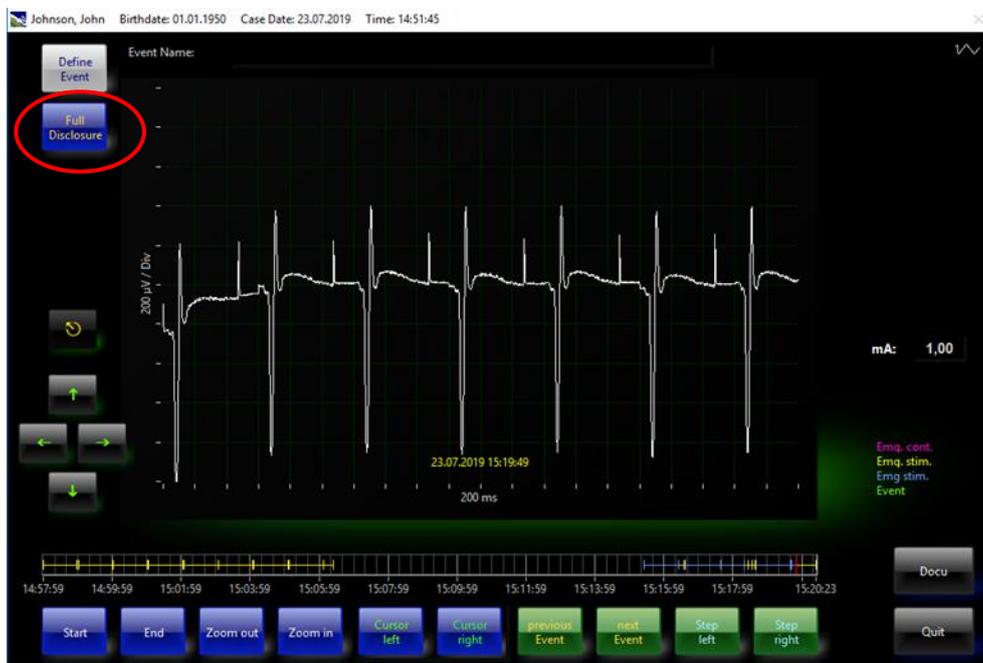


Figure 26: Offline data window with Full Disclosure button

After loading the data of a patient, you can press the <Full Disclosure> button to activate the “Full Disclosure” function in the offline data window (Figure 26).

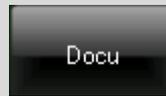


Figure 27: Full Disclosure window

## Explanation of the functions available in the Full Disclosure window



With the <Previous Episode> and <Next Episode> buttons you can display the episode before or after the currently displayed episode.



<Docu> button for documentation and printout of the signals with the available options.



Display of the consecutive evoked response signals (60 s max.). Changes in signal amplitude immediately catch the reviewer's eye. Touching a signal opens a separate window where the neighbouring signals are displayed and analysed. ("Zoom by Touch" function)



Chronological list of the individual stimulation episodes. You can touch a time to view the corresponding episode.



Stimulation with handheld probe



Stimulation with vagus electrode

The selected and displayed episode is displayed with a grey background.

### "Zoom by Touch" function

Touching a signal opens a separate window where the neighbouring signals are displayed at a larger scale. In addition, the signal parameters amplitude and latency are automatically measured.



Figure 28: "Zoom by Touch" function

With the <Docu> button, the displayed signals can be printed with the available options. With the <Quit> button, the window can be cleared.

## 7.5.2 Database

. Paciento duomenų ir registruojamų signalų išsaugojimas integruotoje duomenų saugykloje;

Database

After pressing the <Database> button a list with the stored operations is displayed. At "Number of cases" you see the total number of stored operations.

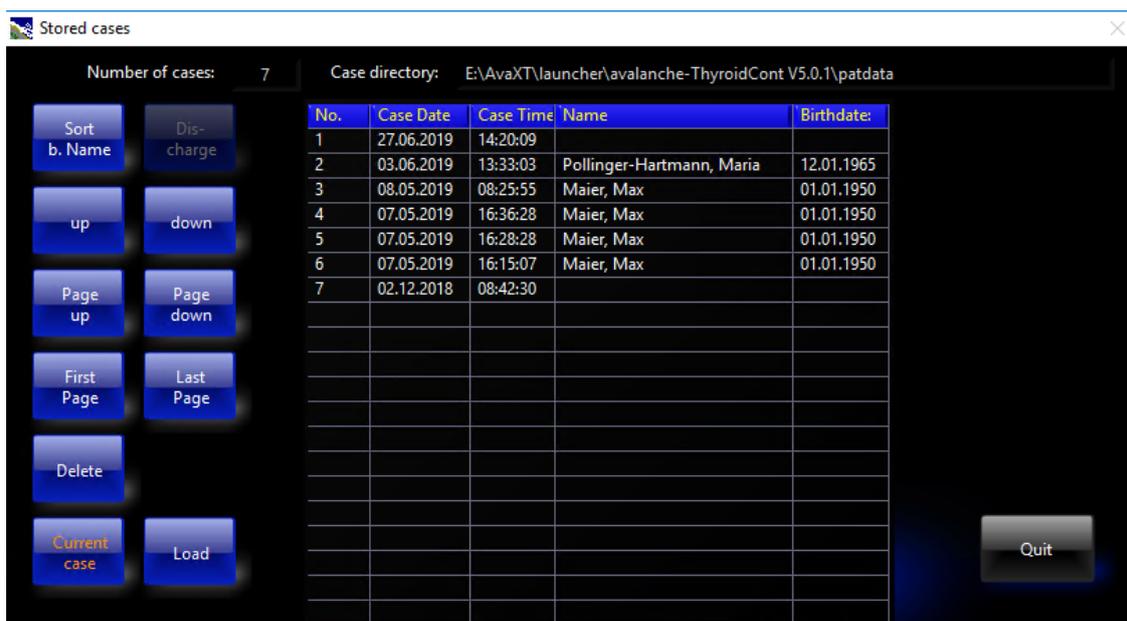


Figure 29: Data selection window / database

In this window you can select cases for review or for deletion.

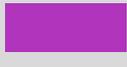
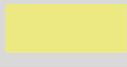
## Explanation of the functions available in the data selection / database window

Sort b. Name		Sorts the data records by patient names
Current case		Displays the current case
Delete		Deletes the selected case
Page up		Scrolls one page up
Page down		Scrolls one page down
First Page		Displays the first page
Last Page		Displays the last page
up		Scrolls one line up
down		Scrolls one line down
Dis- charge		Sends the data to an SFTP server (option)
Load		Loads the data of the current case
Quit		Terminates the offline mode and changes to the EMG window

The response to stimulation with the vagus electrode and with the handheld probe are displayed with different colours.



Figure 30: Symbols in the offline data window

Explanation of symbols in the offline data window	
 Emg cont.	continuous EMG activities
 Emg stim.	stimulations with the handheld probe
 Emg stim. ext.	stimulations with the vagus electrode
 Event	stimulations with the vagus electrode marked as events

**Notice:**

**Functions available after loading data**

- The explanations and descriptions in chapter 7.5.1 also apply to this chapter.

**7.5.3 PDF report function** [Ataskait suformavimas PDF formatu.](#)

If the  button is activated (= ) in the system window (see chapter 7.7), all OR reports will be saved as PDF documents in the device when the **<Print Report>** button is pressed. After creation of a PDF report, the following message will be shown:

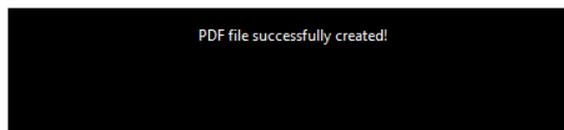


Figure 31: Generating a PDF report

**Notice:**

**Activated PDF report function**

- When the PDF report function is enabled, it is not possible to print the report on the optional printer.

The PDF reports can be copied to a USB flash drive for further processing if desired.

To do so, press the **<Data>** button and then press **<PDF Reports>**.



Figure 32: "Select Data" window

The PDF Manager shows a list of all PDF reports available in the device. The names of the PDF files are based on the entered patient ID as well as on date and time when the report was created.

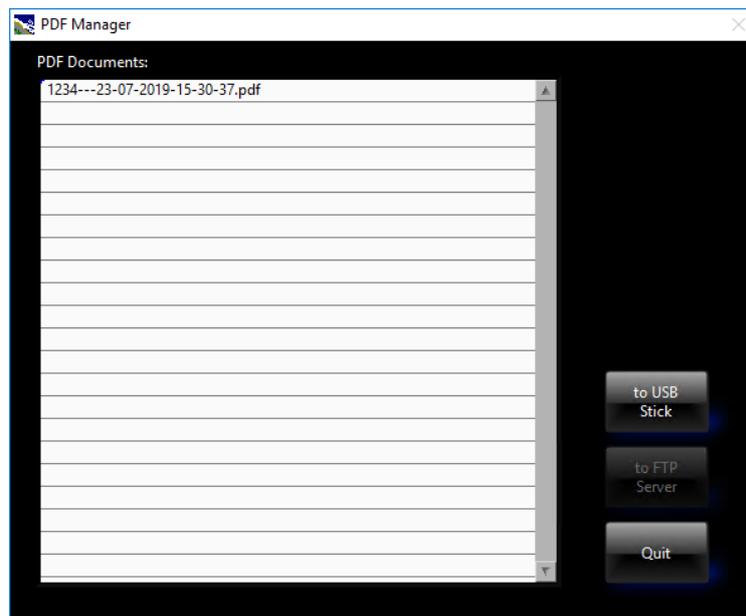


Figure 33: PDF Manager

Connect the USB flash drive to the USB port on the rear panel of the device. Touch the <to USB Stick> button to copy all reports to the USB flash drive.

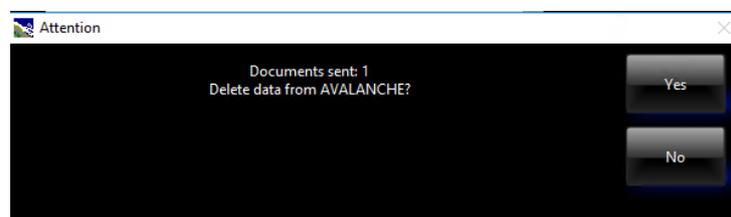


Figure 34: Prompt for deletion of PDF reports in the device after the transfer

A message will inform you about the number of transferred documents. You will be asked whether the PDF reports should be deleted in the device after the transfer. Select <Yes> or <No> as appropriate.

Touch the <Quit> button to close the PDF Manager.

## 10 Technical specifications

### Supply voltage and power consumption

Line voltage	100 V...240 V AC 50 Hz / 60 Hz
Fuse	2 x 1A, slow-blow
Power consumption	100 VA max.

### Signals

Signal form	EMG
Number of measuring channels	1
EMG signal amplification	500
EMG limit frequencies	8 Hz – 5 kHz

### A/D converter

Sampling rate	10 kHz per channel
Resolution	16 bit

### Integrated direct nerve stimulator

Number of stimulation channels	Total of 2, only 1 channel active at a time, switching via VANESSA headbox
Stimulation voltage	+/- 10 V
Pulse shape	rectangular, negative
Pulse duration	200 µs

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### VANESSA headbox(vagus stimulation) for AVALANCHE® SI

Stimulation frequency handheld probe	4 Hz
Stimulation current (handheld probe)	0.1 – 5.0 mA, min. increment: 0.1 mA
Stimulation frequency vagus electrode	3 Hz
Stimulation current (vagus electrode)	0.1 – 5.0 mA, min. increment: 0.1 mA

### Temperatures

Operating temperature	+10°C to +40°C
Ambient temperature: transport and storage	<ul style="list-style-type: none"> <li>temperature -10 °C to 75 °C</li> <li>humidity: 5 % to 95 %</li> <li>atmospheric pressure: 500 to 1060 hPa</li> </ul>

### Dimensions and weight

width x height x depth	460 x 360 x 360 mm
weight	approx. 11 kg

## Standards

Classification according to EU Directive 93/42/EEC	II a
Protection class against electric shock for electrical applied parts according to DIN EN 60601-1	Type BF applied parts
Protection class according to EN 60 601-1	I
Degree of protection	IP20

## Miscellaneous

Accuracy	<ul style="list-style-type: none"><li>• Headbox gain factor: <math>\pm 10\%</math></li><li>• Neuromonitor: <math>\pm 0.25\%</math> of full-scale value</li></ul>
Output limitation: 50 mJ per individual pulse, measured at 1 kOhm	
The device is designed for continuous operation.	
Impedance range of the tissue at which 10mA can be reached: 1000 Ohm max.	

## 17 Accessories and combinable medical devices

### List of accessories & medical devices for neuromonitor AVALANCHE® SI Thyroid VNS

Designation	Article No.	
<b>Signal acquisition with tube electrode or electrode tube</b>	EMG signal acquisition cable, 1-channel	41-0010 ✓
	Push-button cable, green	41-0024 ✓ 41-0034
	Disposable adhesive electrode, push button, 35 x 26 mm	42-0016
	Tube electrode, with connectors complying with DIN 42802-1	42-9800
	Electrode tube, standard tube, with connectors complying with DIN 42802-1, different versions	42-9902 42-9904 42-9906
	Electrode tube, Woodbridge tube, with connectors complying with DIN 42802-1, different versions	42-9912 42-9914 42-9916
<b>Signal acquisition with needle electrode</b>	Bipolar concentric needle electrode, angled tip	42-0000
<b>Stimulation with disposable stimulation probes</b>	Disposable microfork probe, bipolar	40-1004 ✓
	Disposable stimulation probe, bipolar concentric, angled tip	40-1007
	Disposable stimulation probe, monopolar	40-1003
	Disposable needle electrode as reference for stimulation	42-0057
	Adapter for connection of disposable stimulation probes	41-0048 ✓
<b>Stimulation with reusable probes</b>	Probe cable, for connection of bipolar probes	41-0000
	Probe cable with reference, for connection of monopolar probes	41-0004 ✓
	Microfork probe, bipolar, different versions	40-0017
		40-0018
		40-0019
		40-0041
	Microfork ball probe, bipolar, different versions	40-0046
		40-0049
Ball probe, bipolar concentric, angled tip, different versions	40-0053	
	40-0013	
	40-0014 40-0015	
Stimulation probe, monopolar, different versions	40-0003	
	40-0004 40-0051	
<b>Continuous monitoring of the recurrent laryngeal nerve</b>	Disposable saxophone electrode for continuous stimulation of the vagus nerve	42-0068
	Adapter for connection of the saxophone electrode	41-0080
<b>Miscellaneous</b>	Mute sensor, to suppress RF noise signals, different versions	21-0005 21-0020
	Power cord with protective earth conductor	10-0248
	Film for sterile operation of the touch screen	49-0001

More accessories and medical devices can be found in the accessories catalogue of Dr. Langer Medical GmbH.

## 18 Scope of delivery

The scope of delivery of the neuromonitor AVALANCHE® SI Thyroid VNS includes the following components:

Designation	Article No.:
Neuromonitor AVALANCHE® XT with software SI Thyroid VNS	20-0023 <span style="color: blue;">v</span> 30-1100 <span style="color: blue;">v</span>
Optional configurations <ul style="list-style-type: none"><li>• Headbox VANESSA 4-channel for AVALANCHE® SI</li><li>• Headbox VANESSA EMG + EP MM 4-channel for AVALANCHE® SI</li></ul>	21-0025 <span style="color: blue;">v</span> 21-0028
Mute sensor, to suppress RF noise signals, depending on ordered configuration	21-0005 21-0020
Power cord with protective earth conductor	10-0248 <span style="color: blue;">v</span>

## 19 Manufacturer's address



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[info@medical-langer.de](mailto:info@medical-langer.de)



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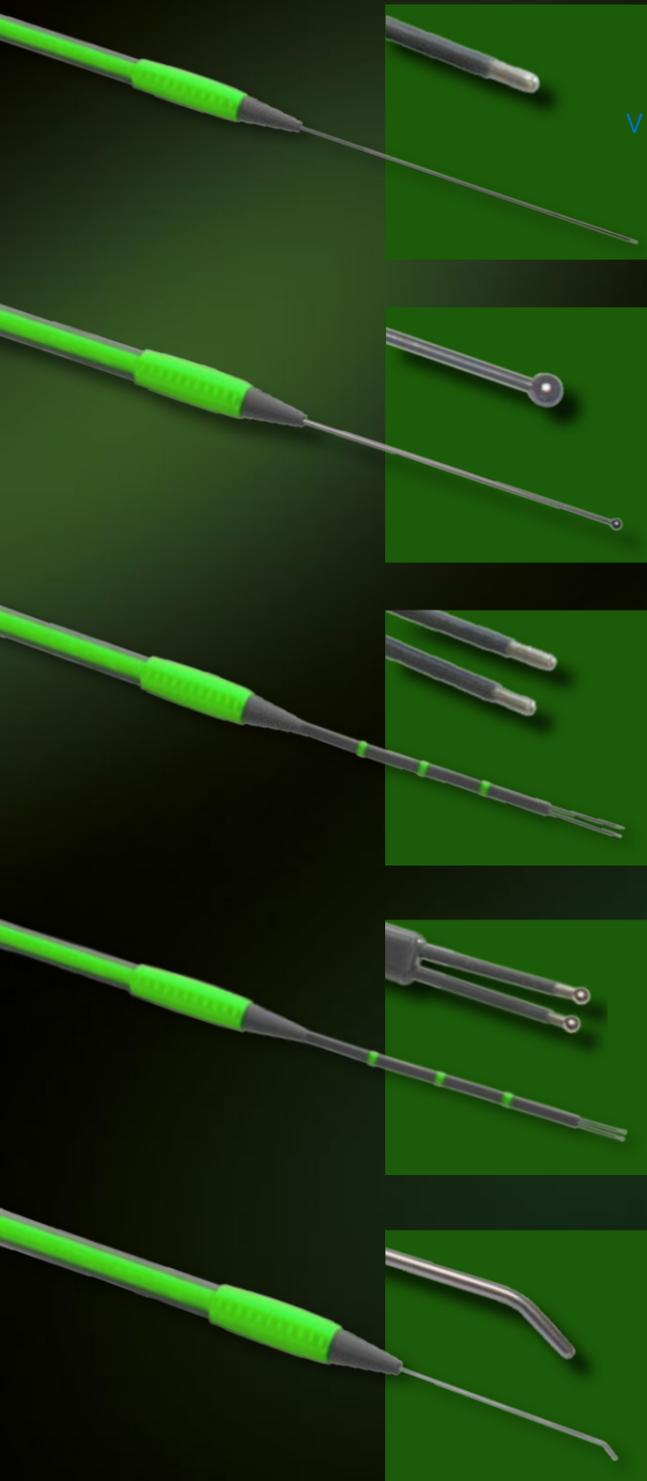
# ACCESSORIES CATALOGUE

from 2021

# Disposable stimulation probes

# Disposable stimulation probes

## Disposable stimulation probes



40-1003 **Disposable stimulation probe, monopolar<sup>1,2</sup>**  
shaft length 90 mm, insulated shaft, Ø 1.0 mm,  
cable length 2.5 m, with DIN 42802-1  
40-1303 connectors, individual sterile packaging, 5/pk

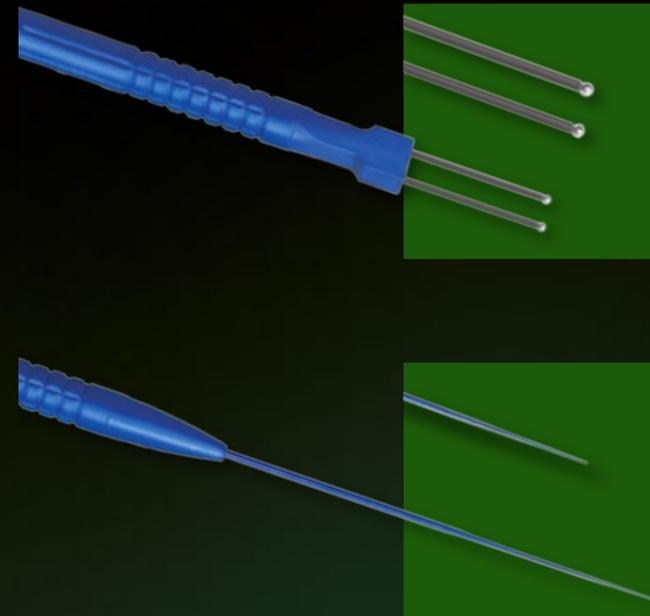
40-1006 **Disposable ball probe, monopolar<sup>1,2</sup>**  
shaft length 90 mm, ball Ø 2.4 mm,  
cable length 2.5 m, with DIN 42802-1  
40-1306 connectors, individual sterile packaging, 5/pk

40-1004 **Disposable microfork probe, bipolar<sup>2</sup>**  
shaft length 90 mm, cable length 2.5 m,  
with DIN 42802-1 connectors,  
40-1304 individual sterile packaging, 5/pk

40-1008 **Disposable microfork ball probe, bipolar<sup>2</sup>**  
shaft length 80 mm, ball Ø 0.9 mm,  
cable length 2.5 m, with DIN 42802-1  
40-1308 connectors, individual sterile packaging, 5/pk

40-1007 **Disposable stimulation probe, bipolar concentric<sup>2</sup>**  
shaft length 60 mm, 30° angle tip, Ø 1.2 mm,  
cable length 2.5 m, with DIN 42802-1  
40-1307 connectors, individual sterile packaging, 5/pk

## Disposable stimulation probes



40-1100 **Disposable cortex probe, bipolar<sup>2</sup>**  
shaft length 30 mm, ball Ø 2 mm,  
cable length 2.5 m, with DIN 42802-1  
connectors, individual sterile packaging, 5/pk

40-1101 **Disposable flush-tip probe, monopolar<sup>1,2</sup>**  
shaft length 95 mm, flexible and insulated  
shaft, cable length 2.5 m, with DIN 42802-1  
connectors, individual sterile packaging, 5/pk

### Page 20



<sup>1</sup> To use our monopolar disposable stimulation probes, you need the subdermal disposable needle electrode (42-9712). ✓

### Page 35

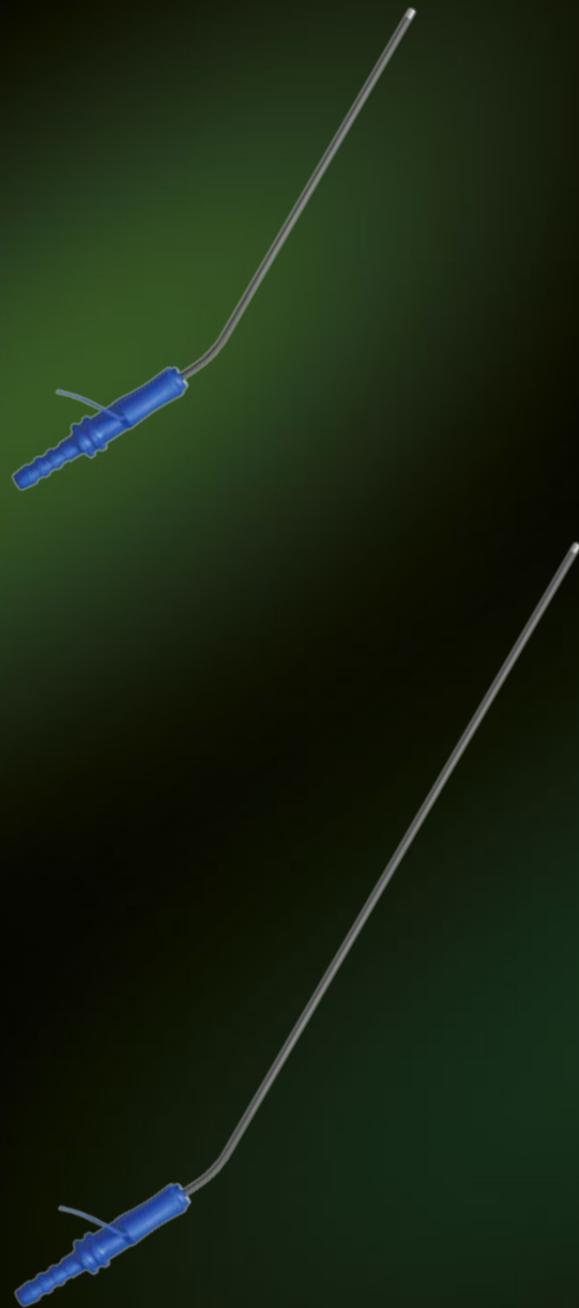


<sup>2</sup> To use our disposable stimulation probes with DIN 42802-1 connectors, you need the adapter with the green/grey connector (41-0048 or 41-0080) or the adapter with the grey/grey connector (41-0087).

### Note article numbers disposable stimulation probes

The disposable stimulation probes of Dr. Langer Medical GmbH have been certified as medical device class III according to EU directives in 2021. These class III stimulation probes have the article numbers REF 40-13xx (approved for use on the central nervous system), the previous class IIa stimulation probes have the article numbers REF 40-10xx (not approved for use on the central nervous system). Due to local differences in regulations, the duration of the necessary registration processes may vary internationally. During the transition period, both part numbers (REF 40-13xx and REF 40-10xx) are valid. Please inquire about the availability of Class III stimulation probes in your country before placing your initial order.

## Monopolar suction probes



40-1102 **Monopolar suction probe<sup>1,2</sup>**  
length 130 mm, with DIN 42802-1 connector, for stimulation and simultaneous aspiration of conductive fluids, cable length 2.5 m, fields of application: brain mapping, spine surgery, TOETVA, individual sterile packaging, single use, 5/pk

40-1103 **Monopolar suction probe<sup>1,2</sup>**  
length 260 mm, with DIN 42802-1 connector, for stimulation and simultaneous aspiration of conductive fluids, cable length 2.5 m, fields of application: brain mapping, spine surgery, TOETVA, individual sterile packaging, single use, 5/pk

## Monopolar stimulation probes



40-0000 **Ball probe, monopolar**  
shaft length 60 mm, ball Ø 2.4 mm, for connection to monopolar probe cables from Dr. Langer Medical GmbH, delivered non-sterile, autoclavable

40-0001 like item 40-0000, shaft length 90 mm

40-0002 like item 40-0000, shaft length 120 mm



40-0003 **Stimulation probe, monopolar**  
shaft length 60 mm, insulated shaft, tip Ø 2 mm, straight, for connection to monopolar probe cables from Dr. Langer Medical GmbH, delivered non-sterile, autoclavable

40-0004 like item 40-0003, shaft length 90 mm

40-0051 like item 40-0003, shaft length 120 mm



40-0028 **Stimulation probe, monopolar**  
shaft length 90 mm, insulated shaft, tip Ø 1.5 mm, 30° angle tip, for connection to monopolar probe cables from Dr. Langer Medical GmbH, delivered non-sterile, autoclavable

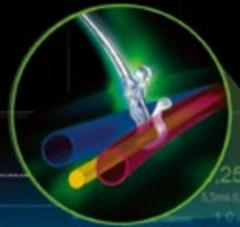
40-0037  like item 40-0028, shaft length 300 mm



40-0038 **Stimulation probe, monopolar**  
usable length 250 mm, insulated shaft, curved, ball Ø 1.5 mm, for connection to monopolar probe cables from Dr. Langer Medical GmbH, delivered non-sterile, autoclavable

## Continuous monitoring of the recurrent laryngeal nerve during thyroid surgeries

**Saxophone electrode after Professor Lamadé**  
Continuous vagus nerve stimulation



**Electrode tube / tube electrode**  
Signal acquisition at the vocalis muscle



**Handheld probe**  
Intermittent stimulation

**Signal analysis**  
- display  
- storage  
- documentation

**AVALANCHE® SI 2**  
Thyroid VNS Software specifically designed for thyroid surgery

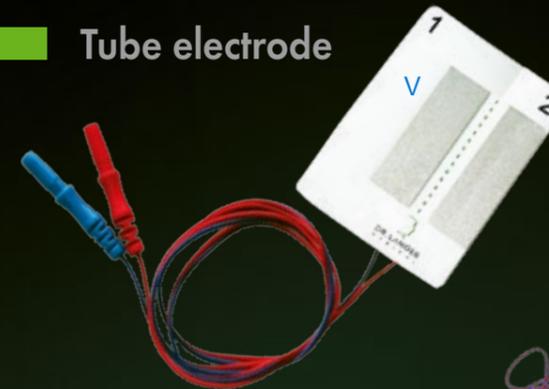


### Vagus electrode



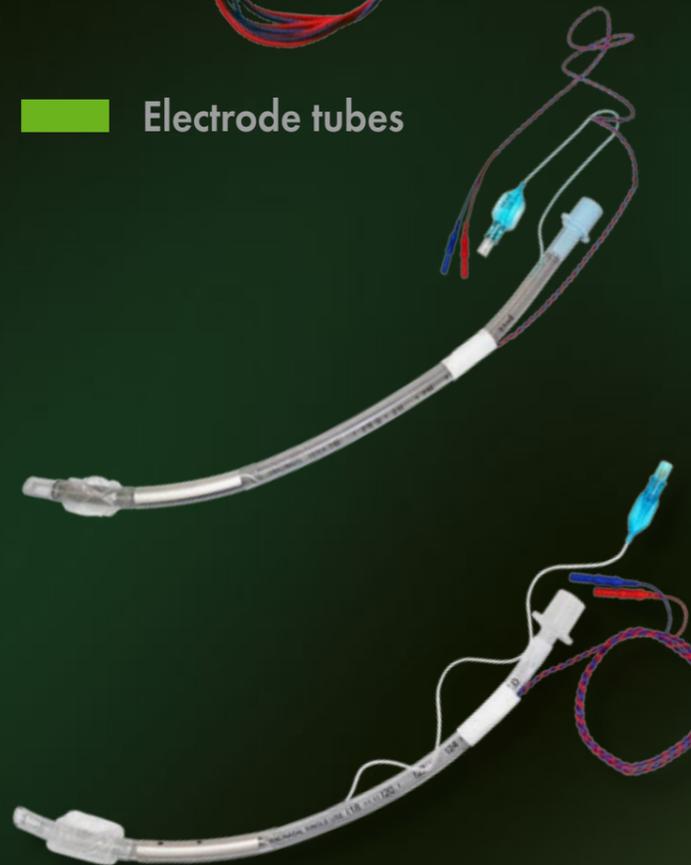
42-0068 **Disposable saxophone electrode** for continuous stimulation of the vagus nerve after Professor Lamadé, cable length 175 cm, with DIN 42802-1 connectors, individual sterile packaging, 5/pk

### Tube electrode



42-9800 **Adhesive tube electrode** suitable for use with spiral and standard tubes with diameters  $\geq 7.5$  mm, cable length 75 cm, with DIN 42802-1 connectors, single use, individual sterile packaging, 5/pk

### Electrode tubes



42-9912 **Electrode tube, I.D. 6.0 mm**  
Woodbridge tube with stylet for intraoperative neuromonitoring, 1-channel, cable length 75 cm, with DIN 42802-1 connectors, single use, individual sterile packaging, 5/pk

42-9913 like item 42-9912, I.D. 6.5 mm

42-9914 like item 42-9912, I.D. 7.0 mm

42-9915 like item 42-9912, I.D. 7.5 mm

42-9916 like item 42-9912, I.D. 8.0 mm

42-9902 **Electrode tube, I.D. 6.0 mm**  
Standard tube for intraoperative neuro-monitoring, 1-channel, cable length 75 cm, with DIN 42802-1 connectors, single use, individual sterile packaging, 5/pk

42-9903 like item 42-9902, I.D. 6.5 mm

42-9904 like item 42-9902, I.D. 7.0 mm

42-9905 like item 42-9902, I.D. 7.5 mm

42-9906 like item 42-9902, I.D. 8.0 mm

## Stimulation probe cables



41-0000 **Probe cable for AVALANCHE® headbox and AVALANCHE® PLUS I/O box** for connection of bipolar probes from Dr. Langer Medical GmbH, cable length 2.5 m, green/black connector, delivered non-sterile, autoclavable



41-0004 **Probe cable with reference for AVALANCHE® headbox and AVALANCHE® PLUS I/O box** for connection of monopolar probes from Dr. Langer Medical GmbH, cable length 2.5 m, green/black connector, delivered non-sterile, autoclavable



41-0002 **Bipolar probe cable with DIN 42802-1 connectors** (black, red) for connection of bipolar probes from Dr. Langer Medical GmbH, cable length 2.5 m, delivered non-sterile, autoclavable



41-0027 **Monopolar probe cable with DIN 42802-1 connector** (black), without reference for connection of monopolar probes from Dr. Langer Medical GmbH, cable length 2.5 m, delivered non-sterile, autoclavable

Page 20



The monopolar probe cable 41-0027 is used in combination with one of the reference electrodes listed on page 20.

## Snap button cables



41-0022 **Snap button cable, black** for connection of adhesive electrodes with snap button, cable length 1.5 m, with DIN 42802-1 connector, not autoclavable

41-0023 **Snap button cable, red** for connection of adhesive electrodes with snap button, cable length 1.5 m, with DIN 42802-1 connector, not autoclavable

41-0024 **Snap button cable, green** for connection of adhesive electrodes with snap button, cable length 1.5 m, with DIN 42802-1 connector, not autoclavable

41-0034 like item 41-0024, cable length 0.6 m

## Adapters

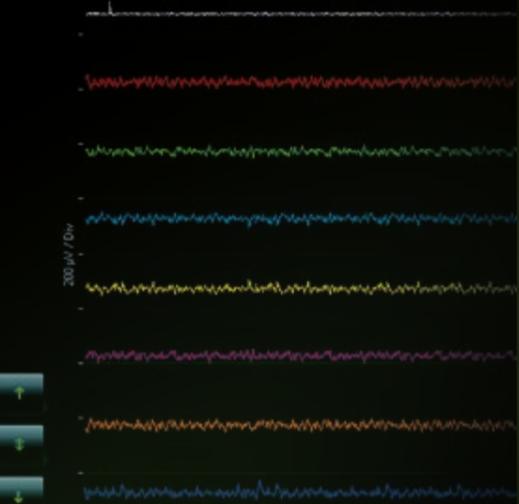


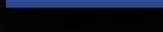
41-0048 **Adapter for AVALANCHE® headbox and AVALANCHE® PLUS I/O box** for connection of stimulation probes and electrodes from Dr. Langer Medical GmbH with DIN 42802-1 connectors, cable length 0.2 m, connector green/grey, not autoclavable

41-0080 **Adapter for AVALANCHE® headbox and AVALANCHE® PLUS I/O box** for connection of stimulation probes and electrodes from Dr. Langer Medical GmbH with DIN 42802-1 connectors, cable length 1.5 m, connector green/grey, not autoclavable

41-0087 **Adapter for AVALANCHE® PLUS I/O box** like item 41-0080, connector grey/grey

**User-friendly application**



channel 1		white
channel 2		red
channel 3		green
channel 4		light blue
channel 5		yellow
channel 6		purple
channel 7		orange
channel 8		dark blue

The 8 colours of our disposable subdermal needle electrodes match the EMG channel colours of the AVALANCHE® SI 2 system.

## Subdermal needle electrodes



- 42-9710 **Subdermal, monopolar disposable needle electrode**  
black, needle length 18 mm, needle diameter 0.4 mm, cable length 1.5 m, with DIN 42802-1 connectors, individual sterile packaging, 24/pk
- 42-9711 **Subdermal, monopolar disposable needle electrode**  
green, needle length 18 mm, needle diameter 0.4 mm, cable length 1.5 m, with DIN 42802-1 connectors, individual sterile packaging, 24/pk
- 42-9712 **Subdermal, monopolar disposable needle electrode**  
white, needle length 18 mm, needle diameter 0.4 mm, cable length 1.5 m, with DIN 42802-1 connectors, individual sterile packaging, 10/pk

**Page 6**

The subdermal reference needle electrode 42-9712 is required for application of the monopolar disposable stimulation probes (40-1303 or 40-1306).



## Subdermal needle electrodes



- 42-9700 **Disposable subdermal needle electrode set**  
12 x white, 12 x red, consisting of 2 electrodes (twisted wire), needle length 18 mm, needle diameter 0.4 mm, cable length 1.5 m, with DIN 42802-1 connectors, individual sterile packaging, 24/pk
- 42-9701 **Disposable subdermal needle electrode set**  
12 x green, 12 x light blue, consisting of 2 electrodes (twisted wire), needle length 18 mm, needle diameter 0.4 mm, cable length 1.5 m, with DIN 42802-1 connectors, individual sterile packaging, 24/pk
- 42-9702 **Disposable subdermal needle electrode set**  
12 x yellow, 12 x purple, consisting of 2 electrodes (twisted wire), needle length 18 mm, needle diameter 0.4 mm, cable length 1.5 m, with DIN 42802-1 connectors, individual sterile packaging, 24/pk
- 42-9703 **Disposable subdermal needle electrode set**  
12 x orange, 12 x dark blue, consisting of 2 electrodes (twisted wire), needle length 18 mm, needle diameter 0.4 mm, cable length 1.5 m, with DIN 42802-1 connectors, individual sterile packaging, 24/pk
- 42-9704 **Disposable subdermal needle electrode set**  
2 x (white + 6 colours), 2 x (black + 6 colours) consisting of 2 electrodes (twisted wire), needle length 18 mm, needle diameter 0.4 mm, cable length 1.5 m, with DIN 42802-1 connectors, individual sterile packaging, 24/pk

# Disposable electrodes

## Adhesive electrodes



42-0015 Disposable adhesive electrode,  
snap button  
15 x 20 mm, 20/pk

42-0016 Disposable adhesive electrode,  
snap button with solid gel  
42 x 24 mm, 50/pk



# CONNECTION CABLES

# Other accessories

## Accessories for AVALANCHE® / TWISTER® MM



44-0015	<b>Foot switch</b> to control device functions, cable length 6 m
44-0000	like item 44-0015, cable length 3 m

## Accessories for AVALANCHE®



21-0005	<b>Mute sensor</b> for connection to AVALANCHE® to blank RF-noise, cable length 4 m, not autoclavable
21-0020	like item 21-0005, cable length 7 m



44-0006	<b>Thermal paper roll</b> for AVALANCHE® XT, paper width 113,5 mm, PU = 5 pieces
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V

44-0019	<b>Trolley for AVALANCHE® si</b> with isolating transformer, 4 electrically conductive castors (two lockable), two shelves and one drawer
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V

Prietaisas komplektuojamas su  
vežimliu su keturiais ratais. Du ratukai turi užspaudžiama stabdi

# AVALANCHE<sup>®</sup> SI 2

*Prepared for the future*



Direct-Nerve-Stimulator	
Stimulus type	Constant current
Number of channels for VANESSA Headbox	1 2 (only 1 channel active)
Stimulation current for Thyroid VNS software	0.05 – 10 mA, <span style="color: red;">Stimuliavimo intensyvumo reguliavimo ribos</span> in steps of 0.01 mA / 0.1 mA and 1 mA 0.1 – 5,0 mA, in steps of 0.1 mA / 1 mA
Stimulation voltage	Max. +/- 10 V
Pulse frequency for VANESSA Headbox	3 Hz or 30 Hz 3 Hz or 4 Hz
Pulse shape / pulse polarity	Rectangle, negative
Pulse duration	200 $\mu$ s
Current confirm	Notification (acoustic and visual), if the delivered current is within the tolerance of +/- 10% of the set value
Output impedance: output on output off	< 500 $\Omega$ > 10 M $\Omega$

SEP-Stimulator: TWISTER® MM channel 1 - 4	
Stimulus type	Constant current
Number of stimulation channels for Carotid software	4 1
Stimulation current	1 – 100 mA, in steps of 0.1 mA
Stimulation voltage	Max. +/- 150 V
Pulse frequency for Carotid software	1 – 20 Hz, in steps of 0.1 Hz 5.3 Hz
Pulse shape / pulse polarity for Carotid software	Rectangle, positive / negative / bipolar Rectangle, positive / negative
Pulse duration for Carotid software	100 – 1000 $\mu$ s, in steps of 1 $\mu$ s 200 $\mu$ s

## Dimensions and weight

Width x height x depth	460 x 360 x 360 mm
Weight	Approx. 11 kg

## Supply voltage and power consumption

Line voltage	AC 100 - 240 V, 50 Hz / 60 Hz
Fuse	Voltage AC 250 V, rated current 1 A, dimensions 5 x 20 mm, Interrupting Rating: 35 A @ 250 VAC 2 x 1A/T 250 V
Power consumption	Max. 100 VA

## Standards

Classification according to EC Directive 93/42/EEC	Ila
Protection type against electric shock for electrical application parts according to DIN EN 60601-1	Type BF
Protection class according to EN 60601-1	I
Protection type according to EN 60529	IP20

## Other

CPU	Intel Celeron, 1.5 GHz
HDD (storage of measurement data)	128 GB
Monitor screen	1024 (H) x 768 (V) Pixel / 15 inch <i>Monitoriaus ekrano istrateine 38,1 cm</i>
Handling	Touchscreen
Operating system	Windows 10 IoT
Interfaces	Ethernet WLAN (optional) USB SFTP (optional) HL7 (optional) Remote Support