BERTHOLD TECHNOLOGIES

LB 9509
Junior

Operating Manual
32526BA2

Rev. Nr.: 07, 08/2018

Contents

Symbol Key

This symbol indicates a dangerous situation. Failing to heed this warning poses the threat of **injuries or equipment damage!**

\+ This character indicates **important information.**

○ This character is used to indicate **processing steps.**

□ This character marks **enumeration.**

[ ] **Messages on the *junior's* display** are written in bold type and set in brackets [ ], for example [**Measurement Start**].

< > **Function keys** for the ***junior*** are written in bold type and placed in arrow keys <**ENT**> or <**ON**>.

Safety Instructions

Please do always act according to the following safety instructions, before as well as during operation of the system! Before set up and operation of the instrument it is necessary to read the instructions below as neither safe operation of the instrument nor safety of the user are guaranteed otherwise. Failure to follow the instructions may invalidate the warranty.

For Your Safety

The ***junior*** has been designed and manufactured in accordance with state-of-the-art technology and regulations governing technical safety.

The manufacturer has taken all steps to guarantee safe operation. The user must ensure that the instrument is set up and installed so as not to compromise its safe usage. Furthermore it is the operator's responsibility to adhere to any local laws and regulations applicable to the installation and use of this instrument.

Instruments are factory tested and delivered in a condition safe for operation.

This manual contains instructions and warnings that must be followed in order to enable safe operation of the instrument!

To disconnect the instrument from power pull out the power supply DC- connector or pull out the wall power supply from main power.

Use only the power supply provided with the instrument: (BERTHOLD TECHNOLOGIES ID-No.68052).

FOX 18 power supply, Rating:
Input: 100-240V AC; 50-60Hz; 400-200 mA; Class II
Output: 5,9V DC / 3000mA

The instrument is designed for indoor use only.

The following safety instructions are to be observed before starting the instrument and during its operation:

- The instrument may only be put into operation by authorized persons and used by properly-trained personnel. All users of the instrument must first read the instruction manual.
- Users should only carry out maintenance and repair procedures found in the manual. During these procedures, no equipment other than that mentioned in the manual should be used. All maintenance and repair work not covered in the instruction manual is to be carried out only by service technicians authorized by BERTHOLD TECHNOLOGIES.
- Make sure that the power supply provided is suitable for your line voltage.
- Always keep the sample holder clean!
- Avoid electrostatic charges!

BERTHOLD TECHNOLOGIES accepts no liability (also in cases of third-party involvement) for damages caused through improper use of the instrument.

For the safety of the user and to ensure good working condition, the proper steps for starting, testing and maintaining the instrument are to be followed.

Consignes de Sécurité

Instructions d'utilisation prescrites pour l'utilisation des applications

Le junior est un luminomètre compact. Il est conçu pour les mesures biologiques et de chimioluminescence en utilisant des réactifs qui génèrent un rendement lumineux relativement constant. Les applications typiques sont par exemple: la recherche, les diagnostics clinique et la surveillance de l'hygiène.

Il est impératif de respecter les consignes de sécurité suivantes non seulement avant la mise en service mais aussi pendant le fonctionnement de l'appareil! Avant l'installation et mise en service de l'instrument tous les utilisateurs des appareils sont tenus de lire d'abord ces instructions de service, autrement ni le fonctionnement correct de l'appareil ni la sécurité de l'utilisateur peuvent être garantis. Ne pas suivre ces instruc-tions de service peut invalider la garantie.

Pour votre sécurité

Le ***junior*** a été fabriqué conformément aux prescriptions de sécurité en vigueur pour les appareils de mesure électroniques et médicaux. Si l'installation et/ou l'utilisation des appareils de mesure de prélèvements-échantillons sont/est soumise(s) à des réglementations prescrites par la loi, il appartient à l'utilisateur de les respecter.

Le constructeur a fait tout le nécessaire pour assurer le fonction-nement sûr des appareils (du point de vue électrique, électronique et mécanique).

L'utilisateur est tenu de veiller à ce que les appareils soient installés correctement afin d'éviter toute altération de leur utilisation sûre.

Les appareils sont contrôlés à l'usine et livrés dans un état assurant la sécurité de fonctionnement.

L'instrument doit être utilisé conformément à ces instructions. Inobservation peut entraîner un état dangereux de l'opération.

Ce mode d'emploi contient des informations et avertissements qui doivent être suivis par l'utilisateur afin de garantir un fonctionnement sûr des instruments.

Pour couper l'alimentation de l'appareil retirer le cable DC ou le débrancher de la prise d'alimentation murale.

Utilisez uniquement le bloc d'alimentation fourni avec l'instrument (BERTHOLD TECHNOLOGIES. ID N ° 68052) avec une tension principale de 100V à 240V et une tension secondaire de 5,9 V DC / 3000mA. Le pôle négatif est à l'intérieur de la prise.

Les variations de tension d'alimentation principale ne doit pas dépasser + 10% de la tension nominale (230VAC).

L'appareil est destiné uniquement pour une utilisation à l'intérieur des bâtiments.

Attention! Ce symbole d'alarme, vous avertit de prêter attention aux consignes opératoires. En effet si vous ne suivez pas ces instructions, il peut y avoir un risque d'endommagement du matériel et également vous faire encourir des risques pour votre propre sécurité.

Il est impératif de respecter les instructions du mode d'emploi et de les respecter :

- Les appareils doivent être mis en service et utilisés strictement conformément aux recommandations du constructeur. La mise en service est réservée au personnel formé et autorisé.
- Lire attentivement les instructions dans le mode d´emploi.
- Afin d'assurer la sécurité de l'utilisateur et le bon fonctionnement des appareils, effectuer les travaux d'inspection et d'entretien recommandés par le fabricant. Toutes les mesures d'entretien et de réparation allant au-delà de celles spécifiées dans ce manuel sont réservées aux techniciens autorisés par BERTHOLD TECHNOLOGIES.
- Assurez-vous que l'alimentation fournie est adaptée à votre tension d'alimentation.
- Garder toujours le support d'echantillon proper.
- Éviter les décharges électrostatiques!

BERTHOLD TECHNOLOGIES décline toute responsabilité de dommages résultant d'une utilisation non conforme à l'emploi prévu, y compris les dommages causés à des tiers.

1. Overview

Intended Use Statement

The ***junior*** is a compact luminometer which is suitable for measuring all types of ”glow” luminescence, i.e., bio- and chemiluminescent reactions that emit a constant light output over a given period of time. The ***junior*** may be used for the following purposes:

- Biomedical research
- Hygiene monitoring
- Process control in biotech
- Environmental monitoring of water quality

Common applications are:

- Reporter gene assays
- Enzyme activity studies
- ATP measurements, including detection of microbial contamination
- Toxicity and mutageneity of water samples

The *junior* must not be used for in vitro diagnostics.

The ***junior*** is designed for **rapid standard measurements** of single samples. Measurement results are given in RLUs (Relative Light Units). These results can be classified in 3 categories by user-definition of two threshold values.

The advantages of the ***junior*** in a single glance:

- High accuracy of measurement with easy readout
- Simple operation of standard applications
- Storage of different measurement protocols
- Automatic storing of the last 2000 measurements, comprising the date, time, site identification number and test number
- Display of stored results
- Transfer of (selected) results to a PC
- Deletion of measured results
- Operation using mains supply or rechargeable batteries

... and operation is so simple

The Display

After the ***junior*** is switched on with the <**ON**> key, the Start display appears in the Display mode. The desired line can be selected using the arrow keys ▲ ▼, and the <**ENT**> key activates the selected field (see figure 1.1):

If you wish to select

- the Options field (for example, [**Measurement Start**]), measuring starts;
- the Input field (Number), the Input mode is activated and the numerator can be modified;
- the Selection field (for example, [**Assay**]), the Selection mode is switched on and selections can be made from the available options.

Selections or input are confirmed by pressing <**ENT**>, which causes the return to the display mode.
Pressing <**ESC**> in the Display mode leads back to the menu in the preceding level, for example, from the Start menu to the Main menu (see figure 1.2).

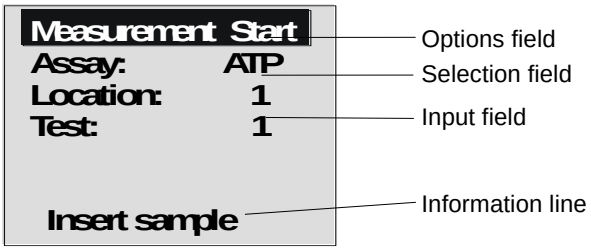

Figure 1.1: *Start display*

The Key Functions (also see Chapter 4.2)

ON	Switches on the instrument. Press “ON” again the display illumination can be switched on or off.
OFF	Switches off the instrument.
ENT	Activates the selected field: Menu field, Input or Selection field. Input and Selection mode: Confirms the entry or selection.
ESC	Display Mode: Move one level higher in the menu hierarchy. Input and Selection mode: Return to Display Mode without transferring changes.
▲ ▼	Display mode: Select a line. Selection mode: Page through the selection list. Input mode: Modify number values.
◀ ▶	Input mode: Move the cursor. Selection mode: Select Yes/No.

Overview of the menus

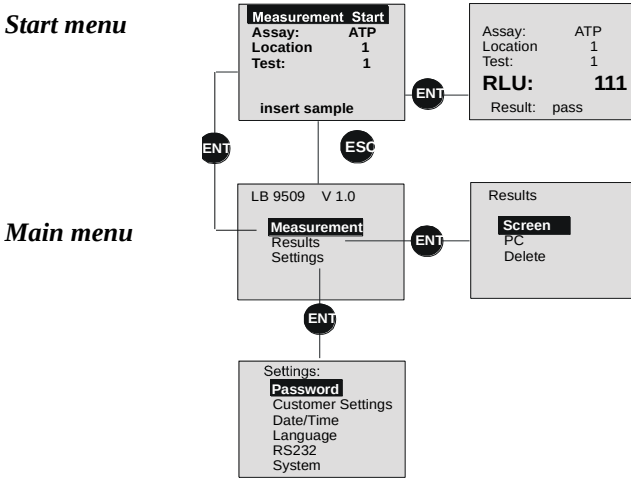

Figure 1.2: *The menu structure*

How do I proceed?

Step	Chapter	Page
1. Getting started	3	20
2. Define measurement protocol	5.2	29
3. Select measurement protocol	6.1	37
4. Measure	6.2	38

Where in the manual is the explanation found?

Function	Chapter	Page
Start display	6.1	37
Start measuring	6.2	38
Site identification	6.1	37
Test identification (in process)	6.1	37
Selecting a measurement protocol	6.1	37
Changing a measurement protocol	5.2	29
Saving measured results	6.2	38
Displaying measured results	7.1	41
Transferring measured results	5.5, 7.2	34, 42

2. Instrument Set-Up

Function, quality and reliability were the values most important during development.

On the front panel of the ***junior*** you have access to the measuring chamber containing the sample holder and photomultiplier (see Chapter 2.2) and the control panel (see Chapter 2.1).
The connector USB 2.0 for data transfer and connector for the accompanying power supply are located on the rear panel of the ***junior*** (see Chapter 2.3).
The battery compartment is placed on the bottom.

The housing is protected against beating rain according to IP54 and can be operated in temperatures up to 35° C (recommended: 30 °C).

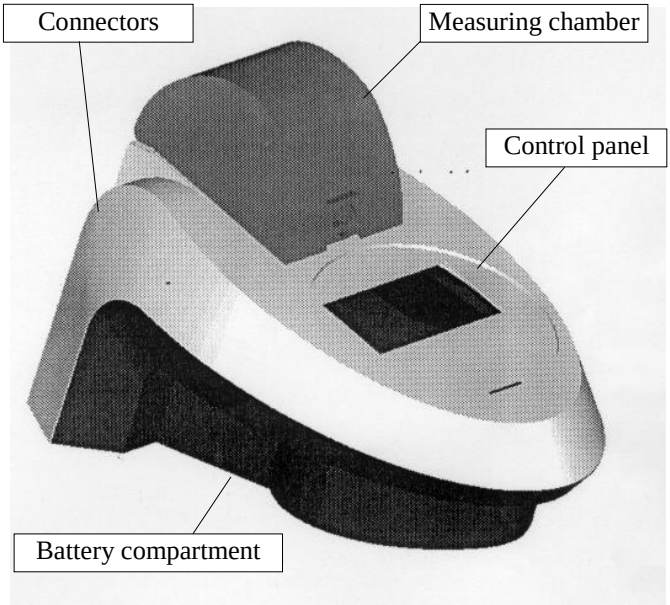

Figure 2.1: *Instrument set-up*

2.1. Control Panel

The control panel contains 6 function keys that operate the software and 2 keys that control the power switch, as well as the graphic display.

The display's background illumination is automatically switched to the energy-saving mode when the key pad has not been used for several seconds. It will automatically be switched back on with the next use of the key pad. Contrast and brightness of the display can be software adjusted (see Chapter 5.6).

Figure 2.2: *Control panel*

2.2 Measuring Chamber

The measuring chamber contains both the sample holder and the photomultiplier. It can be opened using the black button. Only in its closed state the measuring chamber is light-tight, which is a prerequisite for luminescence detection.

Individual test tubes are inserted into the sample holder for measurement. Tube formats range from 12 x 47 mm to 15 x 75 mm. Use the accompanying adapter for optimal results when measuring the smaller sized tube formats.

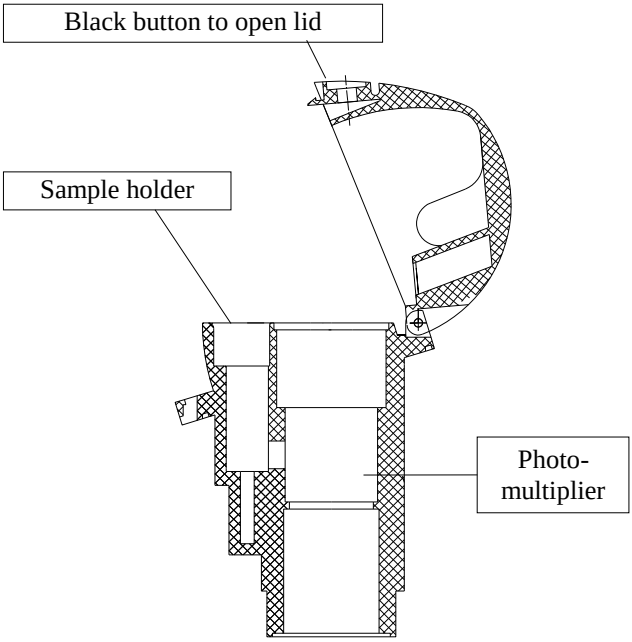

Figure 2.3: *Profile of the measuring chamber containing the sample holder and photomultiplier*

To open the sample holder: Press the black button.

To close: The cover should be pressed down until it clicks into place. Only then is the chamber completely closed to light and measurement process enabled.

The Photomultiplier (Detector)

The photomultiplier (detector) is a single photon counter that operates in a wavelength range of 380 – 630 nm. The linear range covers 6 decades.
The measured counts are directly displayed as RLUs.

2.3 Connections

There are two external connections. Both are located on the rear panel of the ***junior*** and can be protected with the sliding panel:

- USB 2.0 port for transferring data to a personal computer (serial port). A USB Type B → USB Type A cable is required.
- Female connector to connect the accompanying power supply. The negative pole is on the inside of the plug.

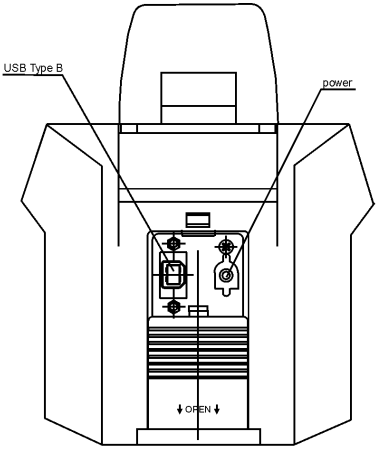

Figure 2.4: *Connections (rear panel of the instrument)*

2.4 Battery Compartment

Remove test tubes from the measuring chamber before turning the instrument over! Danger of damage from leaking fluids!

The battery compartment is located on the instrument's underside.

The compartment is covered by a panel, which is fastened by a screw. The three batteries must be inserted up as shown in figure 2.5.

A warning message is displayed 15 minutes before the batteries become completely discharged. This is indicated by the message: **Battery empty!** The instrument then shuts down.

For battery loading connect the instrument to the mains supply (see chapter 2.3). Loading only takes place if the instrument is switched on. Loading time max. 4-5 hours. (see chapter 2.5)

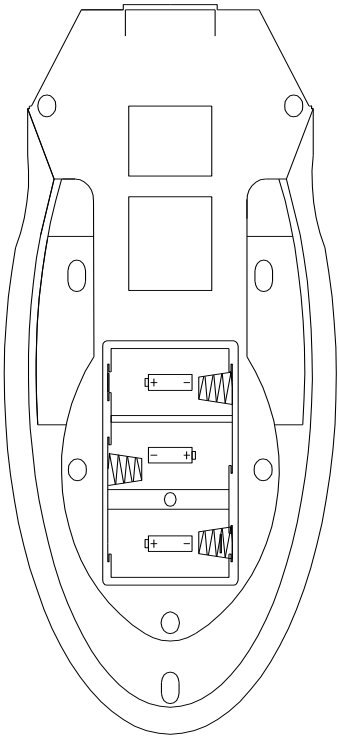

Figure 2.5: *Instrument underside with battery compartment*

Use only the recommended rechargeable battery!
Ni/MH Akku Beltrona C4000 1.2 V/4000 mAh
(BERTHOLD TECHNOLOGIES ordering number 64771)

BERTHOLD TECHNOLOGIES accepts no liability for damages caused through use of other batteries!

2.5 Power Supply

The ***junior*** operates with an input voltage of 5,9-6 V. The instrument can be run by means of either the power supply or the rechargeable batteries.
When the instrument is connected to the power supply and it is switched on, the batteries will be charged. Simultaneously, the ***junior*** can be operated.

Use only the power supply provided with the instrument (BERTHOLD TECHNOLOGIES ordering number 68052).

Battery type	Ni/MH 4000mAh
Operating time without mains supply	6 h
Charging time while operating	4 – 5 h.

Frequent partial depletion and recharging of batteries, together with aging, lowers their capacity. In order to reduce this, batteries should be completely discharged and recharged at regular intervals.

A warning message is displayed 15 minutes before the batteries become completely discharged. This is indicated by the message: **Battery empty!** The instrument then shuts down.

Use only the recommended rechargeable batteries!

The built-in real-time clock is maintained by means of a lithium battery (durability – min. 5 years – lasts usually approx. 10 yrs).

2.6 Software

The user software is set up in a series of menus accessed and controlled by using 6 function keys. The software, parameters, and up to 2000 measurements are stored in the non-volatile memory.
The software will recognize overload conditions that could be caused by excessive light emissions from a sample and display the warning message: **Overload**.

For software operation, see Chapter 4.

3 Getting started

Unpacking

- Unpack the instrument and power supply and check the instrument for damage. Immediately report any problems to the distributor or manufacturer.

Connecting and Switching On

- Slide the protective panel on the rear of the instrument to the open position to access the connections (see figure 3.1).
- Connect the power supply to a suitable mains outlet and plug the in line socket to the power inlet. The internal batteries will start to be charged if the instrument is switched on.
- Switch on the instrument by pressing the **<ON>** key.
- A few seconds after being switched on, the display will first show the instrument model number together with the software version, followed by the Start display (see Figure 3.2).

  Measurements are started here.

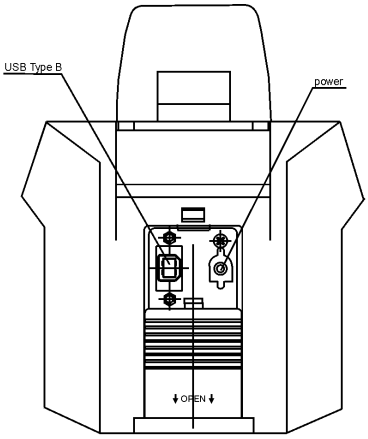

***Figure 3.1: juniors**'s rear panel*

Switching on the instrument in battery mode:

If the ***junior*** is not connected to the power supply, simply press the **<ON>** key.

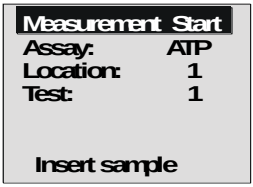

Figure 3.2: *Start display*

4 Software Set-up and Operation

4.1 Set-up

The ***junior***'s software is set up for easy measurement of standard applications.
After switching on the instrument the measurement menu **Measurement Start** appears on the display. A measurement can be started immediately by pressing the **<ENT>** key.
In order to define the measurement parameters or the data output, the user simply changes to the **Main menu**, where the other menus can be selected by pressing the **<ESC>** key:

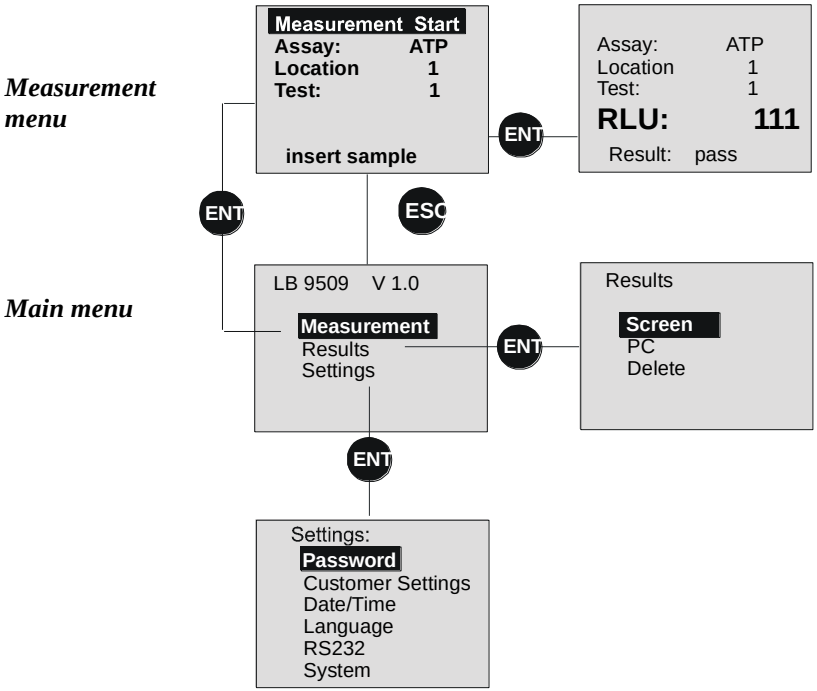

Figure 4.1: *Software set-up*

4.2 Operation

The instrument is operated by use of 8 function keys. The readout follows on a graphic display.
Results are given in **Relative Light Units** (RLUs), which means an integrated value over the measurement period. This RLU value is assembled by the measurement of RLU values in time intervals of 5 msec.

The result is classified as **pass**, **warn** or **fail** according to the thresholds values set previously. Additionally, the classification is indicated by 3 LEDs:

green	=	pass
yellow	=	warn
red (blinking)	=	fail
red (blinking)	=	The measurement has been interrupted due to the opening of the sample holder.
red (blinking)	=	Overload

4.2.1 Display mode

When the ***junior*** is switched on, the readout is automatically in the Display mode. The cursor may be moved from one line to the next ▲▼ by using the arrow key. This causes either the entire line or a field to be marked.
In the Start display the following fields are used for operation (see Figure 4.3):

Input field: to input values,

Selection field: to select text, and

Options field: to select an option or a menu.

4.2.2 Input field

When you mark an Input field (text or figure values) using the cursor and press the **<ENT>** key, the Input mode will be activated, enabling the displayed value to be changed by means of the 4 arrow keys. The Input mode is identified by a blinking cursor.

The blinking cursor marks the points at which changes may be made. The cursor is moved to the next point by pressing the ◀▶ key.

The ▲▼ key enables the value at the selected point to be raised or lowered using a scale of 0–9.

Pressing the **<ENT>** key a second time confirms the value and exits the input mode.

Example: Changing test number 111 to 121

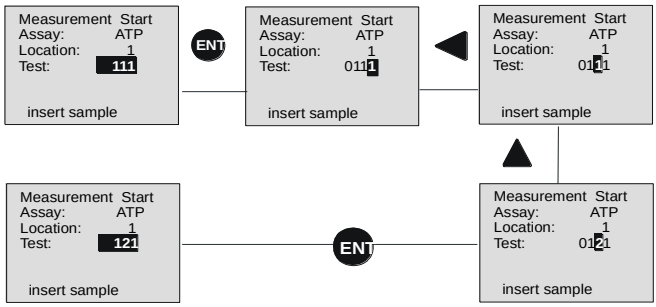

Figure 4.2: *Changing a value*

- Activate the Input mode with ENT. The last digit of the number will be marked by the blinking cursor.
- Press the ◀ key once. The second-to-the-last digit will be marked.
- Press the ▲ key once. The value will increase by 1.
- Press the ENT key in order to confirm the entry and exit the Input mode.

4.2.3 Selection Fields (Text)

When you mark a Selection field using the cursor and press the **<ENT>** key, the Selection mode will be activated, and you will be able to page through the selection list using the arrow ▲▼ key. The Selection mode can also be identified by a blinking cursor.

Pressing the **<ENT>** key a second time confirms the entry. The program returns to the Display mode.

4.2.4 Option Fields

A selected menu or a selected option can be identified by the extended cursor block covering the entire line. If a menu or option has been marked with the cursor, pressing the **<ENT>** key activates the selected menu. The program enters the selected menu or activates the option.

Examples (see Figure 4.1):

- When you select the [**Results**] menu while in the Main menu and subsequently press the **<ENT>** key, the [**Results**] sub-menu and its options will be displayed.
- If while in the [**Results**] sub-menu you select the [**Time/ Date**] option, the entry fields for date and time input will be displayed.

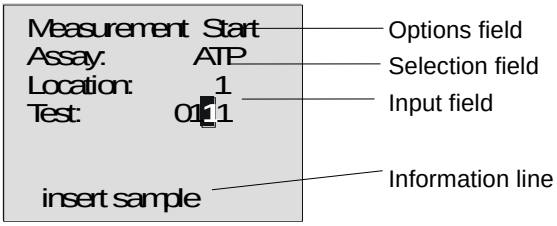

Figure 4.3: *Start display*

4.2.5 The Keys

Switches on the instrument. Press “ON” again the display illumination can be switched on or off.

Switches off the instrument.

In the Display mode: Activates the selected menu or switches to the Input or Selection mode.
In the Input or Selection mode: Confirms the entry/selection and returns to the Display mode.

In the Display mode: Moves one level up in the hierarchy.
In the Input or Selection mode: Returns to Display mode without transferring changes.

In the Display mode: Select a line.
In the Selection mode: Pages through the selection list.
In the Input mode: Raises or lowers the value in the selected area.

In the Input mode: Moves the cursor to the desired area.
In the Selection mode: Selects Yes/No.

5 Setting the Parameter

In the [**Settings**] menu, the user-specific instrument and measurement parameters are defined. These parameters should be set following the first start-up of the instrument. The procedure for doing so is described in the next pages.

In the Main menu, select [**Settings**] and press the **<ENT>** key. This causes the options for the parameter to be displayed.

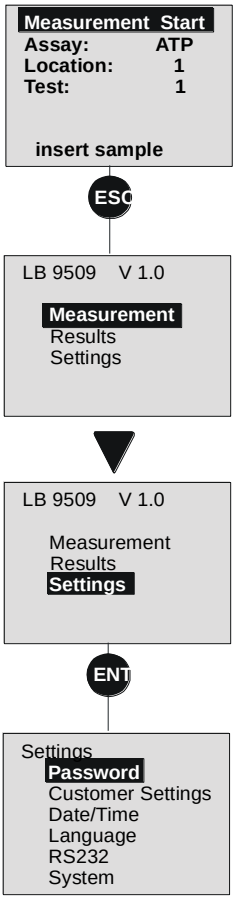

Figure 5.1:
Selecting the menu ***[Settings]***

5.1 Password

If you want only authorized persons to change parameter settings and/or delete results, it is possible to define a password (max. 4 characters). Upon delivery, the ***junior***'s password has been defined as **"0000"**. If this preset password is not changed, each password query can be bypassed by using the **<ENT>** key.

Changing the Password

- In the [**Settings**] sub-menu, choose the [**Password**] option.
- Press the **<ENT>** key.
- Enter the old password.
- Confirm the entry with the **<ENT>** key. The cursor moves to the [**New Password**] line. The Input mode is automatically activated.
- Enter the new password.
- Confirm the entry with the **<ENT>** key. The new password will be accepted, and the program returns to the [**Settings**] sub-menu.

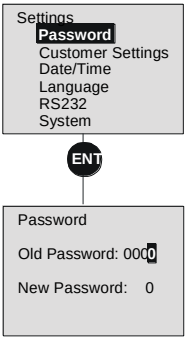

Figure 5.2:
Password entry

The sequence described above can be interrupted at any time by pressing **<ESC>**. The old password is still valid, and the program returns to the [**Settings**] sub-menu.

5.2 User Input (Measurement Parameters)

The measurement parameters are defined in the [**User Input**] sub-menu. A total of up to 6 different programs containing measurement parameters, respectively protocols can be saved for various measurement requirements. The desired program can then be selected with the [**Assay**] query in the Start display prior to measurement start. A protocol record contains all of the parameters that define a measurement: the measuring time and the threshold settings.

Defining the Measurement Parameters

- In the [**Settings**] sub-menu, select the [**Customer Settings**] option.
- Press the **<ENT>** key.
- Enter the password and press the **<ENT>** key.
- (In the event that you have kept the password **"0000"**, it will suffice to press the **<ENT>** key.)
- Select the program for which you wish to change the parameter (for example, [**ATP**]).
- Press the **<ENT>** key. The next screen will be displayed with the [**Error**] parameter selected.

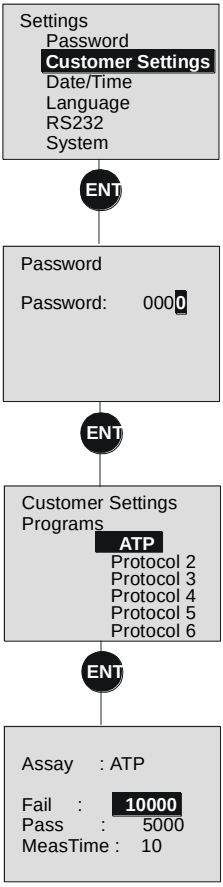

Figure 5.3: *User Input*

- Press the <**ENT**> key in order to activate the Input mode and enter the RLU value for the [**limit fail**] which will serve as the upper/lower threshold value to classify results as **fail**.
- Confirm the entry with the <**ENT**> key.
- Move the cursor to the [**O.K.**] parameter and press the <**ENT**> key.
- Enter the RLU value for the [**limit pass**] which will serve as the lower/upper threshold of the range that will be used to classify results as **pass** (Acceptance range).
- *Be aware* that results that fall between the two thresholds will be classified as **warn** (= Warning range).
- Confirm the entry with the <**ENT**> key.
- Move the cursor to the [**Measuring Time**] parameter and press the <**ENT**> key.
- Enter the desired measuring time in seconds and confirm the entry with <**ENT**>.
- When all individual parameters have been defined and confirmed with the <**ENT**> key, press the <**ESC**> key in order to return to the [**Settings**] sub-menu.
- If you wish, you can select a different program (2-6) and define its measurement parameters. Proceed as described for [**ATP**].

In accordance with the defined threshold values, the results will be displayed and classified:

If [**limit pass**] is smaller than [**limit fail**], RLU values, which are smaller than [**limit pass**], are classified as **pass**.

If [**limit pass**] is higher than [**limit fail**], RLU values, which are higher than [**limit pass**], are classified as **pass**.

[**limit pass**] < [**limit fail**]:

Measurement Results (RLU)	***Class***	***Meaning***	***LED***
RLU ≤ limit pass	pass	Acceptance range	green
limit pass < RLU < limit fail	warn	Warning range	yellow
RLU ≥ limit fail	fail	Error range	red blinking

[**limit pass**] > [**limit fail**]:

Measurement Results (RLU)	***Class***	***Meaning***	***LED***
RLU ≥ limit pass	pass	Acceptance range	green
limit pass > RLU > limit fail	warn	Warning range	yellow
RLU ≤ limit fail	fail	Error range	red blinking

5.3 Date/Time

The ***date and time*** for the internal real-time clock can be entered or changed. All results will be saved with corresponding time and date entries. These also serve as selection criteria for the readout on the display, the transfer of information to a PC, and the deletion of results.
In addition, the format for the date and time can be changed.

Procedure

- In the [**Settings**] sub-menu, select the [**Date/ Time**] option.
- Press the <**ENT**> key.
- Mark the [**Date**] option, press the <**ENT**> key, and enter the desired date as corresponds to the preset format. Confirm the entry with the <**ENT**> key.
- Mark the [**Time**] option, press the <**ENT**> key, and enter the desired time as corresponds to the preset format. Confirm the entry with the <**ENT**> key.

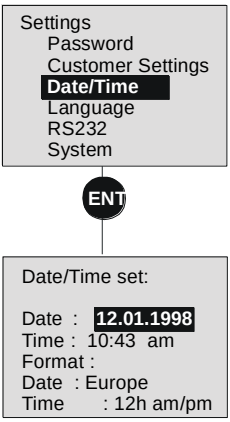

Figure 5.4:
Date and time entry

- To change the Date and/or Time **format**, you should proceed as follows:
- Select option [**Format**]/[**Date**] and press the <**ENT**> key. Select the date format [**USA**] (= 04/24/1998) or [**Europe**] (= 24.04.1998) using the arrow keys. The current date entry will automatically change to the selected format. Confirm the selection with the <**ENT**> key.
- Select the [**Format**]/[**Time**] option and press the <**ENT**> key. Using the arrow keys, select the time format [**12h am/pm**] or [**24h**]. The current date entry will automatically change to the selected format. Confirm the selection with the <**ENT**> key.
- With the <**ESC**> key, return to the [**Settings**] sub-menu.

5.4 Language

The ***junior***'s operation language is selectable.

Procedure

- In the [**Settings**] sub-menu, select the [**Language**] option.
- Press the <**ENT**> key.
- Select the desired language and press the <**ENT**> key in order to confirm the selection. This causes the program to return to the [**Settings**] sub-menu.

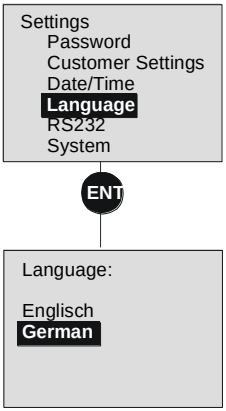

Figure 5.5: *Selecting the language*

5.5 The USB 2.0 Port

The USB 2.0 port on the rear of the ***junior*** enables the transfer of saved data (up to max. 2000 measurements) to a PC. This requires a USB Type B → USB Type A cable.
The transmission parameters necessary for your computer's configuration are to be set in the [**RS232**] menu. In general it is possible to use the pre-set parameters. If the terminal program's settings do not match the ***junior***'s transmission parameters, adapt the program's settings to the ***junior***'s requirements. Otherwise no data transfer is possible.

Changing the Transmission Parameters

- In the [**Settings**] sub-menu, select the [**RS232**] option.
- Press the <**ENT**> key.
- The transmission parameters for the USB 2.0 port will be displayed. Modify these to correspond with those of your PC. Activate the desired parameter with the <**ENT**> key, select the corresponding value, and confirm the selection with the <**ENT**> key.

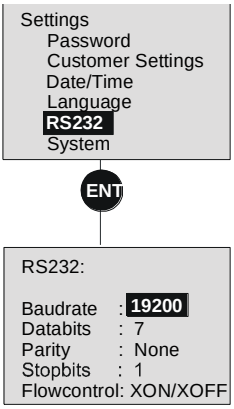

Figure 5.6: *Defining the transmission parameters*

[**Baud Rate**]
Selection: [**300**], [**600**], [**1200**], [**2400**], [**4800**], [**9600**], [**19200**] and [**38400**] Baud.

[**Data Bits**]
Selection: [**7**] and [**8**].

[**Parity**]
Selection: [**None**], [**Odd**], [**Even**].

[**Stop Bits**]

Selection: [**1**] or [**2**]

[**Flowcontrol**]
Selection: [**XON/XOFF**] =
[**Rts/Cts**] =
[**None**] =

- Pressing the <**ESC**> key, returns you to the [**Settings**] sub-menu.

In order to transfer the selected data to your PC, first select the [**Results**] sub-menu in the Main menu and then the [**PC**] option. From this menu it is possible to select the data to be transferred according to date, time, and site (see Chapter 7.2).

Please note:

Your PC must have a terminal program in order to be able to process the transferred data.

5.6 The LC-Display

Using this sub-menu, it is possible to modify brightness and contrast on the LC-display.

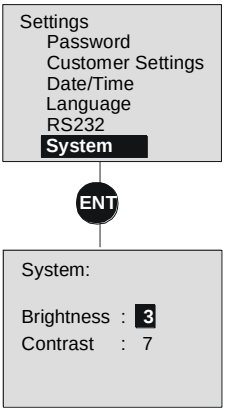

Figure 5.7:
Setting display brightness and contrast

Procedure

- In the [**Settings**] sub-menu, select the [**System**] option.
- Press the <**ENT**> key.
- Select the [**Brightness**] parameter and press the <**ENT**> key. Using the arrow keys, the brightness may be set between levels 1–4. The display illumination is changed simultaneously to this entry.
- Once you have adjusted the brightness to the desired level, press the <**ENT**> key again.
- Select the [**Contrast**] parameter and press the <**ENT**> key. Using the arrow keys, the contrast level may be adjusted between levels 1–10.
- Once you have adjusted the contrast as desired, press the <**ENT**> key again.
- By pressing the <**ESC**> key, you return to the [**Settings**] sub-menu.

6 Measuring

To start a measurement in the Measure menu choose the [**Measurement Start**] option and press <**ENT**>.
Parameters for the measurement can be selected and/or set in the Measure menu. This is achieved by moving the cursor to the appropriate line using the arrow keys ▲ ▼ and activating the Input and/or the Selection mode with the <**ENT**> key. Changes are made by using the 4 arrow keys.

6.1 Possible Adjustments to the Start Display

[**Assay**]
The desired measurement protocols can be selected from 6 variations. These are prepared in the [**Settings**]/ [**User Input**] menu.

[**Location**]

An identification number for the location (site) can be entered.

[**Test**]
An identification number for the measurement can be entered. This number will be automatically raised by 1 following each measurement, but can be changed as the user desires.

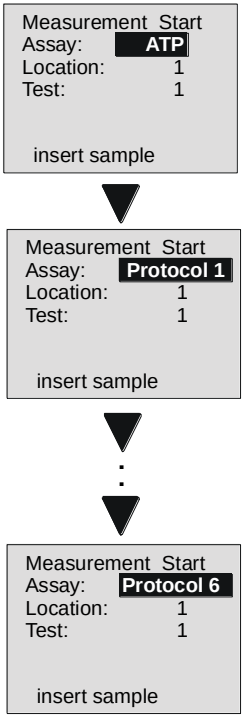

Figure 6.1: *Selecting the desired measurement protocol*

6.2 Measurement Procedure

- Prepare the sample according to the reagent manufacturer's instructions.
- Select the desired measurement protocol and if necessary, enter a location, as well as a test identification number.
- Open the cover of the measuring chamber and insert the test tube into the sample holder.
- Close the measuring chamber. The cap must click into place. The measuring chamber will then be light tight and the measurement can be started.
- At the [**Measurement Start**] menu option, press the <**ENT**> key.
- The measurement will starts. The remaining measuring time in seconds is displayed while the measurement is being taken.

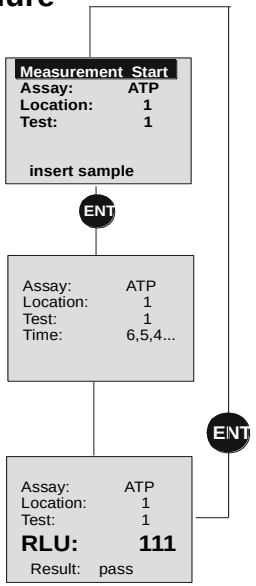

Figure 6.2:
Measurement procedure

- On completion of the measurement the RLU value is displayed. The measurement will also be classified according to the threshold value settings (**pass** = O.K., **fail** = Error range or **warn** = Warning range) and indicated by the illumination of the appropriate LED.

Automatic Storing of Results

The results are saved sequentially. If the memory is full (after the 2000th measurement), the oldest measurement data will be lost.

Stopping a Measurement

- A measurement in progress can be stopped by pressing the <**ESC**> key. A safety query appears asking if you are certain that you would like to abort the measurement.
- Using the arrow keys ◀ ▶, select [**YES**] or [**NO**] and confirm your answer using the <**ENT**> key. The measurement will be aborted following selection of the [**YES**] key, and the program returns to the Start display. Following selection of the [**NO**] key, the measurement continues.

Returning to the Start Display and Restarting a Measurement

- To return to the Start display, press the <**ENT**> key following the completion of the measurement. This causes a return to the Start display and automatically raises the test number by 1. You may immediately start taking a new measurement.

7 Processing the Results

There are several options available in the [**Results**] menu for processing the stored results:

- The results, selected using Time and Site, may be transferred to a PC.
- The results, selected using Time and Site, may be shown on the LC-display.
- Selected results can be deleted.

Choosing the [Results] menu

- When the readout shows the Start display, press the <**ESC**> key.
- The Main menu appears.
- Select the [**Results**] menu.
- Press the <**ENT**> key.
- The options for processing the results will be displayed.

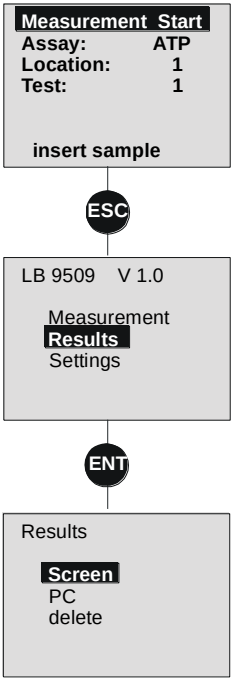

Figure 7.1:
*[**Results**] menu*

7.1 Readouts on the Display

The results can be selected using the time of measurement and the site identification number and subsequently shown one after the other on the LC-display.

Procedure

- Select the [**Screen**] option.
- Press the <**ENT**> key.
- The [**Display by starting at**] display is shown with the selection criteria. Automatically the actual date, time and the site "**0**" are presented. If nothing is changed, the oldest result is shown.
- Enter [**Date**] and [**Time**] as the starting points. This causes all measurements taken between the entered point in time and the current date to be selected for readout.
- As a further criterion for selection, enter the [**Site**] identification number for the measurements that should be displayed. If you would like to display the measurements independently from the site identification, enter **"0"**.
- Select [**Start Search**] with the cursor and press the <**ENT**> key.
- This causes the first (= earliest in terms of time) result corresponding to the selection criteria to be shown.
- Page further with the ▼ key.
- Pressing the <**ESC**> key returns you to the [**Results**] menu.

Figure 7.2:
Displaying results

7.2 Transferring Data to a PC

The measured results can be selected using the time of measurement and the site identification number and subsequently transferred to a PC.

Procedure:

- Connect the USB 2.0 port on the rear side of the instrument with serial free USB port of your PC and start your terminal program (see Chap. 2.3).
- On the ***junior***'s display, select the [**PC**] option.
- Press the <**ENT**> key.
- The [**Display by Starting Point at**] display is shown with the selection criteria. Automatically the actual date, time and the site "**0**" are presented. If nothing is changed, the oldest result is transferred.
- Enter [**Date**] and [**Time**] as the starting point. This causes all measurements taken between the entered point in time and the current date to be selected for transfer.
- As a further criterion for selection, enter the [**Site**] identification number for the measurements that should be transferred. If you would like to display the measurements independently from the site identification, enter **"0"**.

Figure 7.3:
Transferring results to a PC

- Select [**Start Search**] with the cursor and press the <**ENT**> key.
- This causes all results corresponding to the time and site criteria to be transferred to the PC. The message [**Transfer of data**] will appear on the display.
- Pressing the <**ESC**> key returns you to the [**Results**] sub-menu.

Format of Data Transfer

a) Data transfer to PC

Data is transferred in the following order:

Date
Time
Program
Limit pass
Limit fail
Measuring time
Location identification number
Test identification number
Result (= integrated RLUs) **or "Overload"**
<CR> (= carriage return)
<LF> (= line feed)

If an overload occurs during a measurement, "**Overload**" is transferred instead of a result (RLU value).

Each value is separated by using <TAB>.

Example:

03/23/98<TAB>08:32:58<TAB>ATP<TAB>10000<TAB>5000<TAB>10<TAB>1<TAB>3<TAB>1556<TAB><CR><LF>

b) On-line data transfer to PC

Here, data are transferred in the same format and sequence as in a) however, additionally 100 single RLU values are transferred, which are positioned in front of the integrated RLU value. Also the single RLU values are separated by using <TAB>.

If the measurement is aborted, the values are transferred up until stopping the measurement and "**CANCEL**" will be transferred.

7.3 Deleting Results

The results to be deleted are selected using the time of measurement as well as the site identification number and are shown before deletion on the display.

Procedure

- Select the [**Delete**] option.
- Press the <**ENT**> key and enter the password. Confirm the entry with the <**ENT**> key.
- The [**Display by starting at**] display is shown with the selection criteria. Automatically the actual date, time and the site "**0**" are presented. If nothing is changed, the oldest result is deleted.
- Enter [**Date**] and [**Time**] as the starting points. This causes all measurements taken between the entered point in time and the current date to be selected for deletion.
- As a further criterion for selection, enter the [**Site**] identification number for the measurements that should be displayed. If you would like to delete the measurements independently from the site identification, enter **"0"**
- Select [**Start Search**] with the cursor and press the <**ENT**> key.

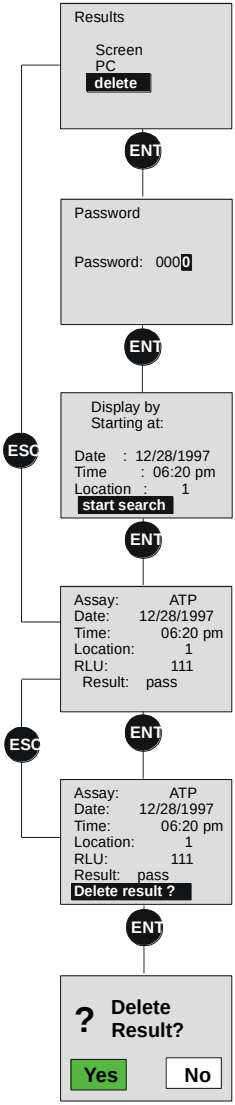

***Figure 7.4**: Deleting results*

- This causes the first measured result corresponding to the entered point in time and the defined site identification to be displayed.
- Page further with the ▼ key until you reach the readout of the result that you would like to display.

- Press the <**ENT**> key to delete the displayed measurement.
- The safety query **[Delete measurement?]** will appear.
- Pressing the <**ENT**> key again will cause the displayed measurement to be deleted and the next measurement to be displayed. The deletion is aborted with the <**ESC**> key, and you can continue paging through the list.
- In this way, you can delete measurements at your discretion.
- Pressing the <**ESC**> key returns you to the [**Results**] sub-menu.

8 Maintenance

The ***junior*** is extremely maintenance-friendly and requires almost very little maintenance.

Please observe the following:

1. Sample Holder

- **The sample holder must always be kept clean and free from dust, in order not to spoil measuring results!**
- **Fluids in the measuring chamber could damage the instrument!**
- **In the event that fluid enters the test chamber, immediately remove the test tube and turn the instrument upside down to remove the fluid before it enter the measuring chamber! Clean the sample holder.**
- **If fluid enters the measuring chamber, inform service personnel immediately!**

2. Caring for the Rechargeable Batteries

To prevent the capacities of the batteries from diminishing, they should be **completely discharged on a regular basis** (every 2–3 months) **and then recharged.**

Discharging duration: ca. 6 h.

Recharging duration: ca. 4–5 h.

In order to discharge the batteries, detach the ***junior*** from the power supply and leave it on for a given period of time, for example, overnight. To recharge the batteries, reattach the instrument to the power supply and switch it on.

3. Cleaning the instrument

The surface of the instrument is protected by a washable finish. Dirty or dusty surfaces should be cleaned using a damp cloth or optical grade tissue. If necessary, use a mild detergent or diluted EtOH.

Do not use a scouring agent!

9 Trouble Shooting

Error	Cause	Solution
Display - 10	HV part could be wet	Turn off instrument and let it dry. Switch on again. If error message appears again, contact service.
other error messages		contact service

10 Technical Data

Detector	Ultra fast single photon counter with spectral sensitivity range of 380-630 nm
Sensitivity	1 fmol ATP using the ATP Bioluminescence Assay Kit CLSII (Boehringer Mannheim, FRG)
Dynamic range	more than 6 decades
Tube format	12 mm diameter, 47-75 mm height; 15 mm diameter, 47-75 mm height
Language	English or German (software selectable)
Display	Graphic display with backlit LED, 128 x 64 dots
Interface	USB 2.0 Type B interface for data transfer to a PC
Software	built-in microprocessor, storage of 6 different measuring protocols
Measurement time	selectable in steps of 1 s between 1 and 999 s
Data storage	storage of the last 2000 results
Power supply	Prim.: 230V / 50Hz; 115V / 60Hz Sec.: 1,2A / 5,9-6V DC (Negative pole is on the inside of the plug!)
Installation category	II
Current consumption	max. 7,5 VA
Batteries	3 rechargeable Ni/MH Akku Baby 1.2 V / 4000 mAh
Humidity	80% at 31°C degreasing linearly to 50% at 40°C no condensation
Altitude	<2000m
Temperature	5°C to 40°C
Recommended operation temperature	+15°C to +30°C
Pollution degree	2
Dimensions (WxDxH)	150 mm x 280 mm x 170 mm
Weight	approx. 2 kg net, incl. batteries