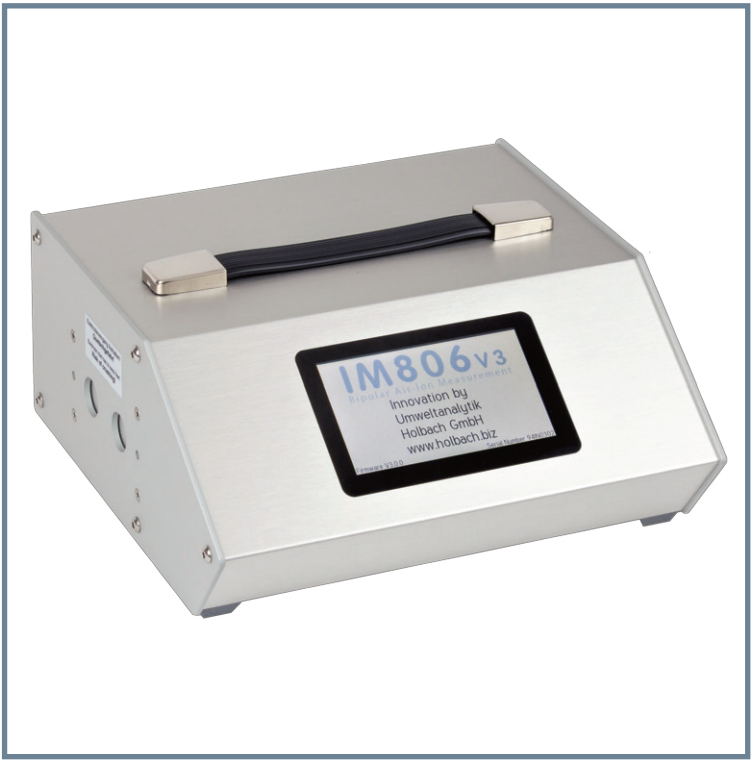
Ionometer IM806v3

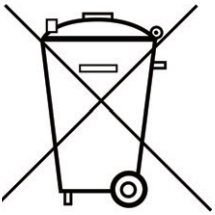


IM806v3

Bedienungsanleitung
Operating Manual

Hinweis zu Altbatterien

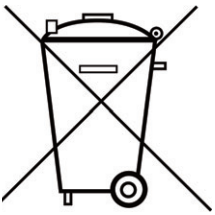
In diesem Gerät befinden sich Batterien:
1 Stück Lithium Knopfzelle Typ CR2032 für Energiepufferung der Echtzeituhr
1 Stück Industriebatterie (Akku) Typ LiPo 14,4 Volt für den Betrieb des Gerätes



Altbatterien (auch Akkus sind Batterien im Sinne des Batteriegesetzes) dürfen nicht in den Hausmüll.
Verbraucher sind verpflichtet, Batterien zu einer geeigneten Sammelstelle bei Handel oder Kommune zu bringen.
Die Batterien dieses Gerätes können nach Gebrauch auch bei uns abgegeben werden.
Altbatterien enthalten möglicherweise Schadstoffe oder Schwermetalle, die Umwelt und Gesundheit schaden können.
Batterien werden wiederverwertet, sie enthalten wichtige Rohstoffe wie Eisen, Zink, Mangan oder Nickel. Das Symbol Mülltonne bedeutet: Batterien und Akkus dürfen nicht in den Hausmüll.
Die Batterien in diesem Gerät enthalten kein Blei, Cadmium oder Quecksilber.

Note on used batteries

This device contains batteries:
1 piece, Type CR2032 lithium button cell for energy buffering of the real-time clock
1 piece, Type LiPo 14.4 Volt industrial battery (rechargeable) for the operation of the device



Used batteries (rechargeable batteries are also batteries in terms of the Batteries Act) may not be disposed in household waste.
Consumers are obliged to take batteries to an appropriate collection point in the trade or local authority.
The batteries of this device may also be returned to us after use.
Batteries may contain harmful substances or heavy metals that can harm the environment or personal health.
Batteries are recycled; they contain important raw materials such as iron, zinc, manganese or nickel.
The rubbish bin symbol stands for: batteries and rechargeable batteries may not be disposed of in household waste.
The batteries in this device do not contain lead, cadmium or mercury.

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Introduction

Thank you very much for choosing our ionometer **IM806v3**.

Please read this manual and the safety instructions carefully **before** using the device.

The portable ionometer **IM806v3** has been developed for continuous measurement of the concentration of positively and negatively charged small ions in the air.

The ionometer **IM806v3** is explicitly only to be used in non-corrosive atmospheres.

Please note the safety instruction in section 14 of this manual.

This manual has to be provided to all persons operating the device and must be kept easily accessible.

The following pictograms are intended to help you read this operating manual:

We recommend reading this paragraph very carefully.

The actions listed in this paragraph are dangerous to persons and the device and are not permitted.

This paragraph describes troubleshooting and maintenance tasks.

The pictograms used are subject to the Creative Commons License; author of the pictograms is the Regional Computing Centre of Erlangen (RRZE).

1. The Ionometer IM806v3

Figure 1 The Ionometer **IM806v3**

The **IM806v3** is notable for:

- the simultaneous measurement of both ion polarities (positive and negative)
- the open measuring system with two parallel arranged electrodes
- the large measuring range from 0...1,000 Ions/cm³ in the smallest range up to 40,000,000 Ions/cm³ in the largest range
- the integrated microSD memory card for measurement storage
- the graphical representation allowing fast recognition of trends of the ion concentration
- the battery operation for up to 15 hours per charge
- the integrated FTP server to transfer the measurements and the web server for measurement display over the network
- the servo driven electrode lid
- the galvanically isolated and configurable analog outputs 0...10 V DC and 0 ... 20 mA DC for each polarity
- display and recording of the climate parameters air pressure, temperature* and relative humidity*
  *Temperature and humidity with optional rotronic HC2A-S sensor

2. Scope of Delivery

The delivery of **IM806v3** includes:

- the measuring device **IM806v3**
- the quick-charger for operation at 100 - 240 V, 50 - 60 Hz
- this operating manual
- a USB connection cable for connection to a PC
- the software IMControl for configuration, remote control, data transfer and adjustment of **IM806v3** on the included data medium (USB memory stick)
- cable with alligator clip to drain off charges
- a replacement 2A slow-blow fuse

And optionally:

- Extension tube for directed guidance of the sampling air
- Temperature/humidity sensor HC2A-S by rotronic
- Handling case (Tanos systainer T-Loc with PE foam insert)

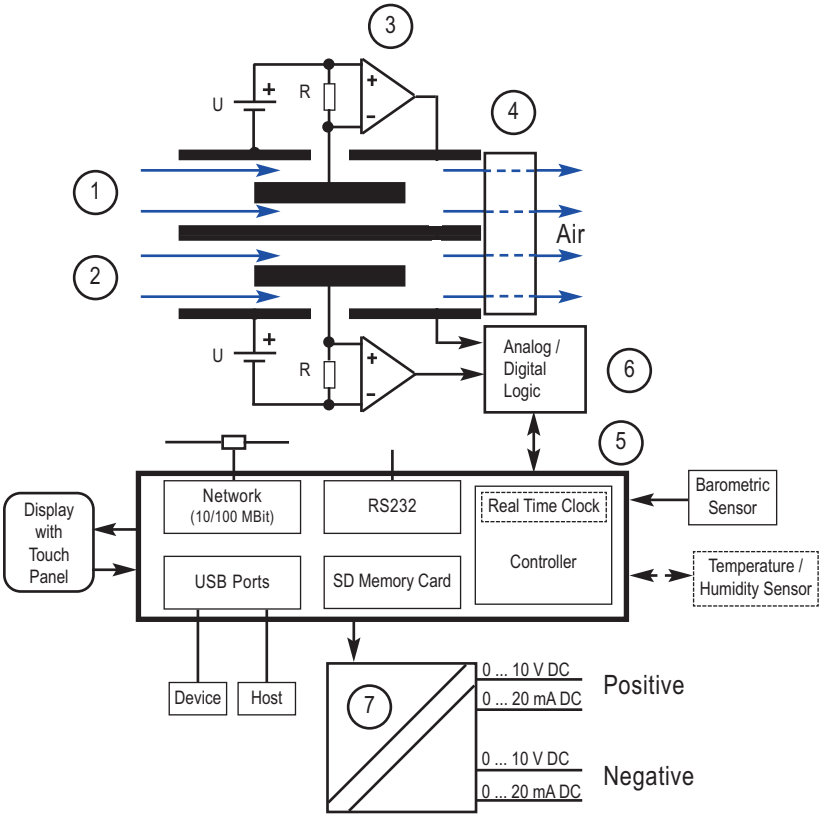


Figure 2 The measurement principle of the **IM806v3**

The measuring system consists of two outer electrode tubes (1 & 2), each of which holds a centric and electrically insulated smaller electrode. Between the outer and inner electrodes, a DC potential is applied, thus generating a DC electric field between the electrodes. The fan (4) continuously draws air at a defined flow rate through both of the electrode tubes. The DC electric field exerts a force in the vicinity of the electrodes on the ions in the streaming airflow

(Coulomb's law) and deflects them to the inner electrodes. Since the polarities of the applied voltage differ in both electrodes, one electrode accelerates the positively charged ions and the other electrode the negatively charged ions to the inner electrode. The flow velocity of the air, the level of the deflection voltage and the geometry of the electrodes are dimensioned such that ions of defined ion mobility reach the inner electrode. Air ions of lower ion mobility (medium and large ions) only partially reach the inner electrode.

At very high ohmic resistances (R) (up to 10^{11} ohm), the charge current flowing during the charge neutralization generates a measurable drop in voltage, which is boosted using suitable measuring amplifiers (3) to a measurable signal proportional to the air ion concentration and then digitalized in the pre-amplifier (6).

The entire sequence of operations is controlled by a microcontroller (5) which also handles the display, the storage logic, the analog outputs (7), the USB interfaces, the serial interface, the network interface and the climate sensors.

The **IM806V3** has an integrated barometric pressure sensor. A connector for the optional temperature / humidity sensor (rotronic HC2A-S) is mounted on the back side of the device.

4. Operating Elements

4.1 Overview of Operating Elements

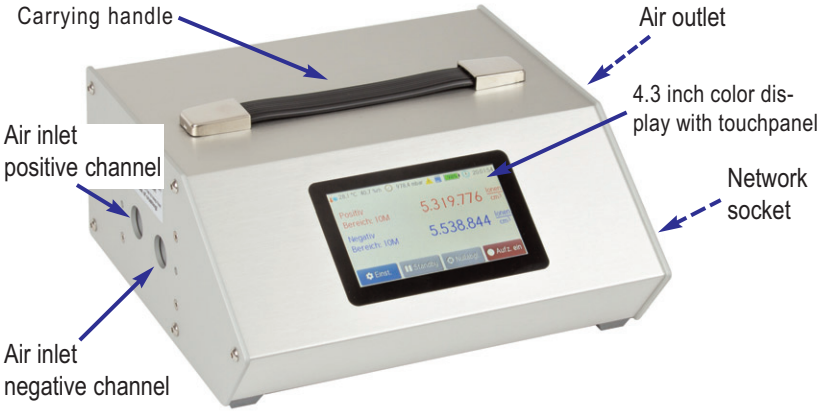


Figure 3 **IM806v3**

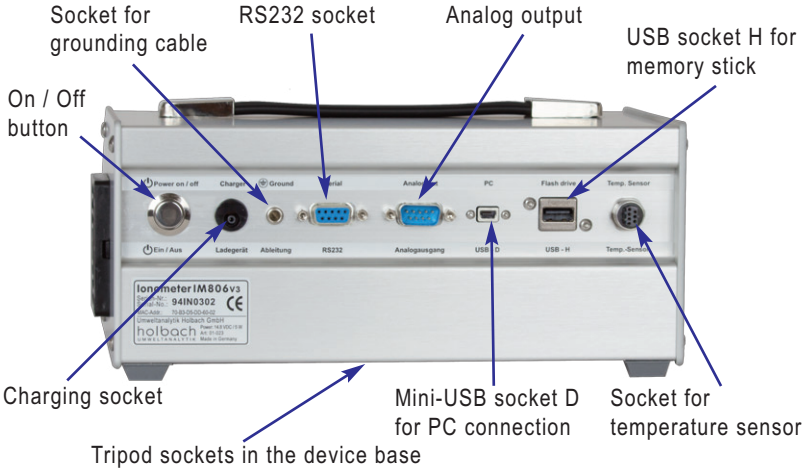


Figure 4 **IM806v3** rear view

4.2 Color Display with Touchpanel

IM806v3 is completely operated using the 4.3 inch color display with touchpanel (except for the on/off button on the rear). The capacitive touchpanel can also be operated with common latex or nitrile gloves.

4.3 Acoustic Signal Generator

IM806v3 has an acoustic signal generator which signals the following events:

Event	Tone Sequence
Power-on	2 short tones
Touch-Click	Click sound
Device alarm	2-tone sequence
Battery voltage low	2-tone sequence
Switching off	2 short tones

4.4 Tripod Sockets

There are two tripod sockets in the **IM806v3** device base: UNC 1/4 inch (Photo) and UNC 3/8 inch (Microphone).

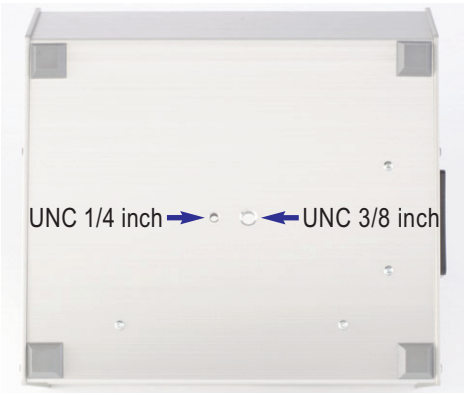


Figure 5 Tripod sockets in the device base

Only use tripods that can support the weight of **IM806v3** (approx. 3 kg) and ensure that they provide a secure standing.

5. Connection Sockets

In the back of **IM806V3** there are seven connection sockets:

5.1 Battery Charger Socket

Connect the charger plug of the included quick-charger into the round battery charger socket (low voltage plug EIAJ5).

Only use the charger that is included in the delivery for charging. Using any other charger can damage the electronics, the integrated rechargeable battery and the charger itself.

Polarity: Inner pin is “positive 14.4 volts”, outer wall “ground”.

5.2 Grounding Cable Socket

In order to discharge possible electrostatic charges from the housing of **IM806V3** the included grounding cable can be plugged into this socket.

This connector is not a protective ground!

5.3 Analog Output

The measurements are also available as galvanically isolated analog voltage and current signals for connection to a writer, a control device, or a data logger. The configuration is explained in section 9.3. The pin assignment is described in appendix A.

5.4 RS232 Socket

The **IM806v3** can be connected to the serial port of a PC and be controlled from there. The baud rate can be adjusted in the device settings.

Default parameters:
Baudrate: 115200
Data bits: 8
Parity: None
Stop bits: 1
Flow control: None

5.5 USB Socket H

A FAT formatted memory stick can be connected to the USB socket H (host). Measurement data can be copied from the SD card to the memory stick in the settings menu.

Figure 6 USB socket H

5.6 USB Socket D

IM806v3 can be connected to a PC running Microsoft Windows using the included USB cable (A to Mini-B) plugged into the Mini-USB socket D (device).

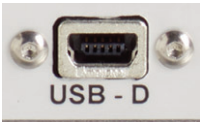
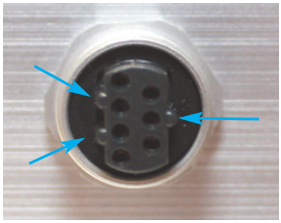


Figure 7 USB socket D

5.7 Socket for External Temp. and Humidity Sensor

IM806v3 features a socket for the temperature and humidity sensor HC2A-S by rotronic. The temperature and humidity measurements are read digitally. An optional extension cable can be connected between the sensor and **IM806v3**. The external temperature/humidity sensor is automatically detected by **IM806v3** when connected and its values get logged with active data recording.



As the socket contacts are asymmetrical, the temperature and humidity sensor HC2A-S only fits in one position into the socket. The sensor is secured with the sleeve nut.

Figure 8 Socket for the temperature / humidity sensor

Figure 9 Temperature- / humidity sensor rotronic HC2A-S

5.8 Network Socket

The 100 MBit network connection is available as a 8-pin RJ45 socket on the right side.

6. Charger

A quick-charger for charging the integrated Lithium-Polymer battery pack (14.4 V / 3800 mAh) is part of the delivery of **IM806v3**.

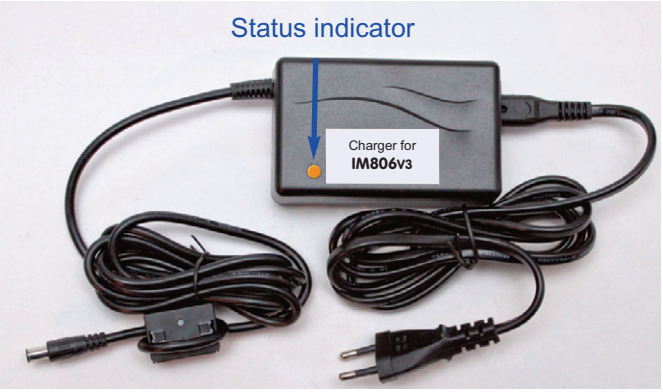


Figure 10 Quick-charger for **IM806v3**

The charger can be operated at a voltage of 100 - 240 volts and a mains frequency of 50 - 60 Hz.

6.1 Using the Charger

Insert the power plug into a mains socket.

After connecting to the mains supply the LED lights up in green.

Insert the plug of the quick-charger into the charger socket of **IM806v3**.

The state of the charger is indicated by an LED with different colors:

Orange: Quick-charging until about 80 - 95% charged

Yellow: Final charge until 100% charged

Green: The battery is fully charged or the charger plug is not connected

Fully charging a completely discharged battery can take up to 2.5 hours.

Figure 11 Rear of the charger containing the status colors, the certification mark and the manufacturer logo

Note: The charger can also be used as power supply. The available current is greater than the current required for the operation of **IM806v3**. When the charger is in use during a measurement, the grounding cable should always be connected (see also section 7.2).

Please note the safety instructions in section 14!

7. Operation

7.1 Switching On

To switch on **IM806v3**, press the on/off button on the back of the device (Figure 4). When switching on, two short signal tones will sound and the display shows the personalization text, the firmware version and the device's serial number for 5 seconds.

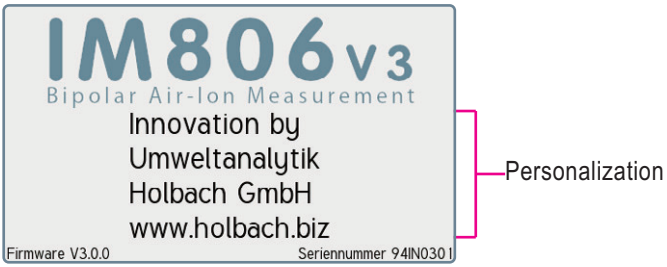


Figure 12 Display when switching on

The personalization text (4 lines with max. 25 characters each) can be defined by the customer prior to shipping and is stored encrypted in the memory of **IM806v3**.

Afterwards, the warm-up phase of the device begins, which lasts for 30 seconds from the start of the device. While the remaining time is counted down to zero, the following functions are available:

Menu: Access the menu for sequence programs and settings
Measure: Start the measurement process
Zero adj.: Start a zero adjustment
Standby: Switch to standby mode

When the warm-up phase has finished, the measuring process automatically starts.

7.2 Measuring

When the measurement process is starting, the electrode lid opens. When the lid is completely open, the fan turns on. Shortly after, the measurements are shown in the display.

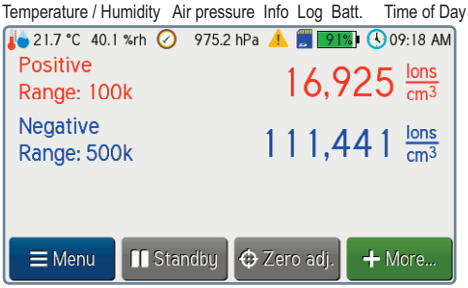


Figure 13 Measurement display

The external temp./humidity sensor is indicated by the symbol .

The symbol “Info” is only shown when a fault has been detected.

The symbol “Log” is shown if measurement logging is enabled.

Some general information on measuring air ions.

Every electric (DC) field affects air ions and deflects them. If the Ionometer **IM806v3** is electrically isolated and has received a charge through coupling, it is possible that it can influence the surrounding air ionization. Accordingly, less ions get into the tube which results in a lower measurement.

In order to avoid this effect, electric charges should be drained off with the provided cable. Plug the isolated 4 mm laboratory plug into the socket of the **IM806v3** and connect the other connector to an grounded electrical connector.

Never plug a laboratory plug into a power socket! **Danger for life!**

Avoid electrostatically chargeable plastics in the vicinity of the electrode. When the charger is connected, the grounding cable should always be connected, too.

Display of the measurements as curve diagram

The measurement display can be switched to graph mode by tapping the buttons More... and then Graph.

The range for the displayed values can be seen in the upper left corner. The curve for the positive ions is drawn in red, the one for the negative ions is drawn in blue.

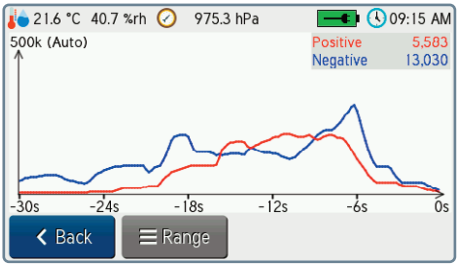


Figure 14 Measurement display as graph

This representation allows to easily detect rapid changes of the measurements visually.

The diagram can be set to a fixed measuring range with the Range button.

You can go back to the normal view with the Back button.

7.3 Manual Measurement Logging

The data logging onto the integrated SD card can be started while measuring by tapping the buttons More... and then Start logging. The logging interval has to be confirmed before starting and can be adjusted in the range from 1 second to 12 hours.

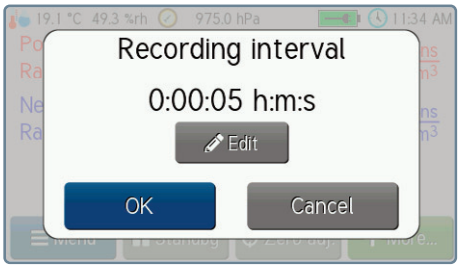


Figure 15 Confirmation dialog for the logging interval

The SD card icon is displayed in the status bar while logging.

An ongoing data logging can be deactivated by tapping the buttons More... and then Stop logging. In addition, the logging is stopped when the ionometer **IM806v3** is switched off.

The structure of the recorded data is described in appendix B.

The files can be transferred via USB using the software IMControl, by copying them to a USB memory stick or through the network using an FTP client.

7.4 Zero Adjustment

A zero adjustment is implemented in order to metrologically eliminate offset values of the different parts in the input amplifier. Since the offset values are also temperature dependent, the warm-up phase should be completed before starting a zero adjustment.

The zero adjustment gets initiated:

- by tapping the button Zero adj.
- at the beginning of a cycle of the sequence control, if “Zero adjust per cycle” is enabled
- in configurable intervals when the sequence control is running, if “Zero adjust interval” is greater than zero

Procedure of the zero adjustment:

- The electrodes are closed.
- For each of the eight measurement ranges, the required offset voltage is set, checked and corrected, if necessary.
- The offset values are determined and saved for future calculations.
- The electrodes are opened.
- The **IM806v3** switches to the measurement mode.

A zero adjustment can take between 30 seconds and 4 minutes. The progress is shown on the screen during the adjustment.

When the measurement logging is active during a zero adjustment, the measurements are saved as zero and a corresponding flag is set.

Note: After about 30 minutes of operation, additional zero adjustments are only necessary if measuring small concentrations of ions (< 500 ions/cm³).

7.5 Standby Mode

The Ionometer **IM806v3** can be put into standby mode between measurements or during configuration.

The standby mode can be entered from all other modes by tapping the Standby button.

In standby mode

- the fan turns off
- the electrodes are closed
- the display illumination gets dimmed and a screensaver is shown

Figure 16 Standby mode with screensaver

If the measurement logging is active, the ion concentrations are saved as zero and a corresponding flag is set during standby mode. The measurements of the temperature, the air humidity and the pressure are logged normally.

To exit the standby mode, you have to tap once on the display to stop the screen saver and afterwards on the button for the desired mode at the bottom of the screen.

Note: Always activate the standby mode if you do not need the measurements. The electrodes are then closed and protected from any unnecessary dirt.

7.6 Alarm Notifications

The peripheral units such as the fan and battery voltage are continuously monitored during operation. In case of a failure an alarm gets issued.

If the setting “Signal on alarm” is enabled, an additional audible signal is output until the OK button is tapped.

A hint on how to resolve the error can be displayed by tapping the info button .

Note: An error of the optional temperature and humidity sensor does not cause an alarm. In that case, the ionometer **IM806v3** acts as if there is no sensor attached.

7.7 Switching Off

IM806v3 is switched off using the on/off button on the back of the device (Figure 4). The button has to be pressed for at least 0.4 seconds.

Two short tones are output and an informational message is displayed to confirm the switching off.

The electrodes will close and the ionometer **IM806v3** will switch off afterwards.

Note: When the on/off button on the back of the device (Figure 4) is pressed for more than 10 seconds, a reset of the internal microcontroller is performed.

8. Sequence Control

The ionometer **IM806v3** features an integrated sequence control that allows for automatic switching between measuring and pauses in configurable intervals. A single measuring process followed by a pause is called a “cycle”. Additionally, an automatic zero adjustment can be performed before each measuring process or in certain time intervals. There are ten storage slots for sequence programs available, which can be preset according to your requirements.

8.1 Starting a Sequence Program

To start a preset sequence program, first tap on the Menu button in the measuring or standby mode to get to the program selection.

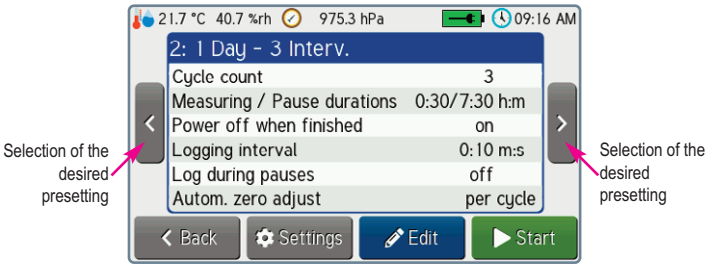


Figure 17 Selecting the desired preset program

The desired program can be selected using the two buttons on the left and the right side of the screen. By tapping the Start button, the shown program gets started. If there is already an active sequence, a dialog is shown before starting to confirm whether the current sequence should be aborted.

While a sequence is running, a block chart is displayed below the measurements to give an overview of the current progress of the sequence.

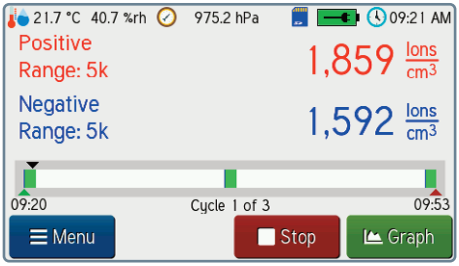


Figure 18 Measurement display with block chart as progress indicator

The block chart visualizes the following information:

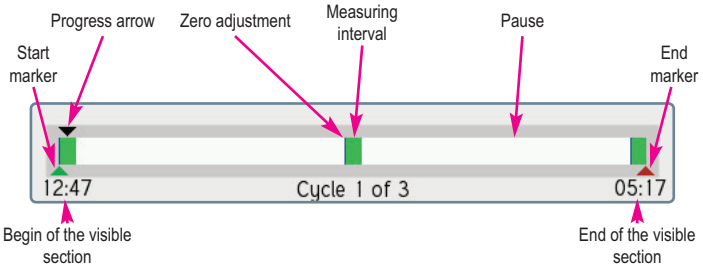


Figure 19 Sequence chart: Entire sequence visible

A green block in the chart indicates a measuring interval. White blocks indicate a pause. If the automatic zero adjustment per cycle is enabled, a thin blue line is displayed at the beginning of the green blocks. The current position in the process is indicated by the black arrow that moves from left to right along the chart. The two time specifications on the left and on the right show which points in time correspond to the begin and end of the chart. Start and end of the entire sequence are indicated by a green or a red arrow, respectively, from below.

8. Sequence Control

If the sequence takes too long to be completely shown in the chart, only the currently relevant part is displayed. In that case, the progress arrow stays in the front part and the block chart itself moves below the arrow to the left. To indicate that the start or the end are not visible in the chart, the green and red arrow will point outwards instead of from below onto the chart. As soon as the end can be shown, the progress arrow will continue to move to the right.

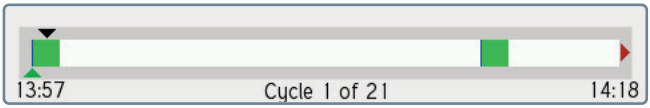


Figure 20 Sequence chart: Only start is visible

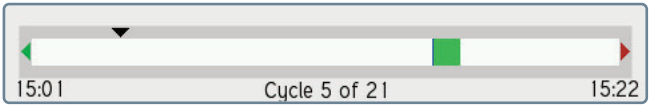


Figure 21 Sequence chart: Neither start nor end are visible

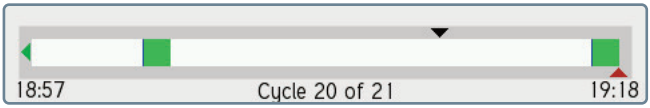


Figure 22 Sequence chart: Only end is visible

8.2 Modifying a Sequence Program

In the following example, the sequence program (program no. 2) will be modified such that the number of cycles is set from 3 to 9 and the logging interval from 10 seconds to 30 seconds.

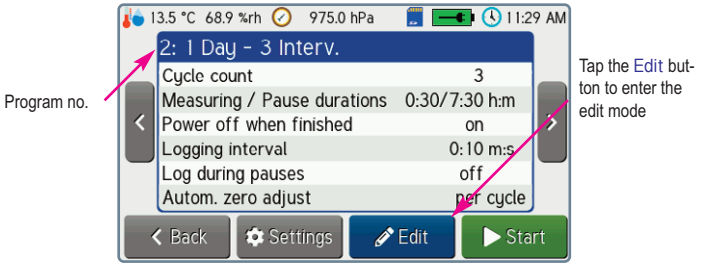


Figure 23 This program should be modified

The edit mode is started by tapping the Edit button.

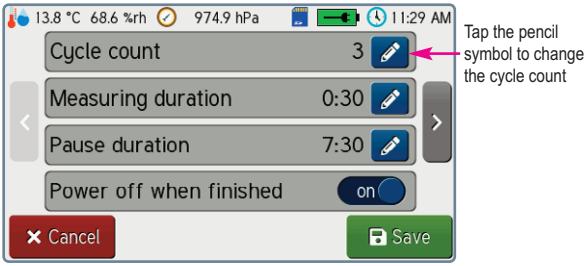


Figure 24 Selection of the parameter to be changed

To change the cycle count, the corresponding button with the pencil symbol has to be tapped.

Note: The description text can be changed using the IMControl software.

After tapping the pencil symbol , the number of cycles can be modified.

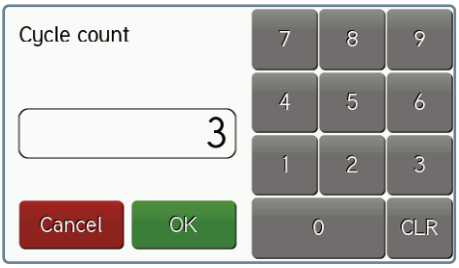


Figure 25 The editor shows the current value

The current value is cleared by tapping the CLR button. Afterwards, the new value can be entered.

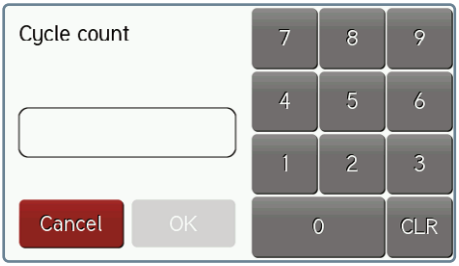


Figure 26 The current value has been cleared

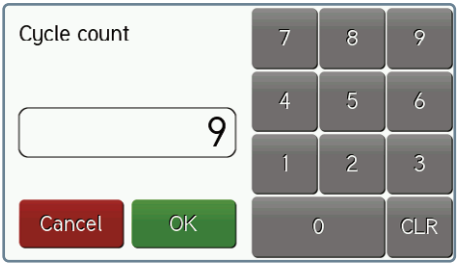


Figure 27 The editor shows the new value

The new value is accepted by tapping the OK button.

To change the logging interval, first switch to the next page using the button on the right of the screen.

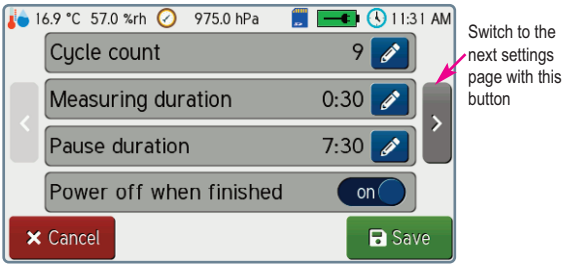


Figure 28 Switching to the next settings page

After tapping the corresponding pencil symbol , the input mask for time entries is shown:

Figure 29 Editor for time entries

Time entries have to be put in the format Hours:Minutes:Seconds.

The new value is accepted by tapping the OK button. Prior to entering the new value, the content of the input field is cleared with the CLR button.

The changes to the presettings are saved by tapping the button Save in the main edit mode screen (Figure 24). Tapping the button Cancel discards the changes.

8.3 Sequence Parameters in Detail

The following parameters can be adjusted for each sequence program:

8.3.1 Description Text

The description text can have up to 20 characters. Changing the text is possible with the IMControl software.

8.3.2 Cycle Count

The number of cycles (one measurement process followed by a pause) can be set in the range from 0 to 100. If this parameter is set to 0, the sequence control runs until it gets manually aborted.

8.3.3 Measuring Duration

The duration for which the measuring should be active per cycle. The valid range is from 1 minute to 24 hours.

Note: If “Zero adjust per cycle” is enabled, the duration is count starting with the zero adjustment. The actual measuring duration is then correspondingly shorter.

8.3.4 Pause Duration

The time that should be spent in pause for each cycle. The valid range is from 1 minute to 24 hours.

8.3.5 Power Off when Finished

If this parameter is enabled, the ionometer **IM806v3** is switched off automatically after all cycles have been processed.

8.3.6 Logging Interval

The measurements can be logged in the set interval during the sequence process. The valid range is from 0 seconds to 12 hours. Setting it to 0 seconds disables the automatic logging. Short interval times with long measuring times lead to a big amount of data which results in a long transfer time.

Further details on the measurement logging are described in section 7.3.

8.3.7 Log During Pauses

If this parameter is enabled, the whole sequence process including the pauses is saved to a single measurement file. The ion concentrations are logged as zero and a corresponding flag is set during the pauses. Otherwise, a new measurement file is created for each cycle which then only contains the actual measuring process.

8.3.8 Zero Adjust per Cycle

If this parameter is enabled, a zero adjustment is performed at the beginning of each measuring process. Since the zero adjustment can take several minutes, a measuring duration of at least 5 minutes is recommended.

8.3.9 Zero Adjust Interval

An automatic zero adjustment can additionally be performed in the interval defined here. The valid range is from 1 minute up to 7 days (168 hours). If this parameter is set to 0 minutes, the function is deactivated. In case the zero adjustment would fall into a measuring pause, it will only be performed at the beginning of the next measurement.
This setting can be enabled independently of “Zero adjust per cycle”. If both functions are enabled, the zero adjustment at the beginning of the cycles will also reset the counter for the interval time. Thus, an interval time greater than the measuring duration will have no effect in this case.

9. Configuration

9.1 Device Settings

The configuration settings of **IM806v3** can be changed directly at the device and using the software IMControl, which is included in delivery.

By tapping the Settings button on the program selection screen (Figure 17), the settings menu is displayed:

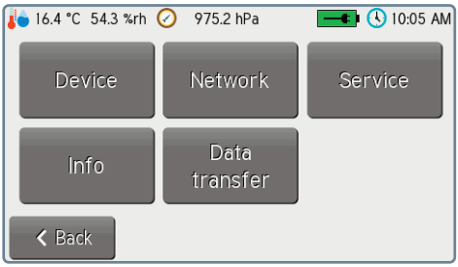


Figure 30 Settings menu

You can go back to the program selection by tapping the Back button.

Tap the Device button to configure **IM806v3**. The first configuration page is shown.

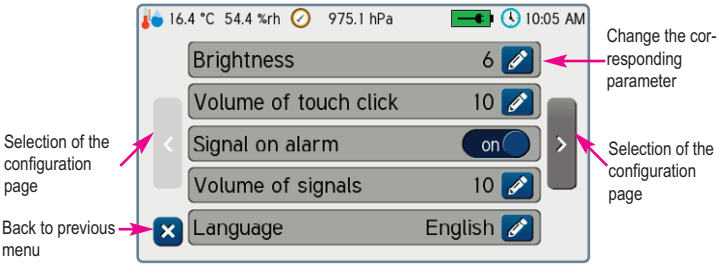


Figure 31 First configuration page

Tap the blue button to go back to the settings menu.

An on/off parameter can be directly changed by tapping the

switch.

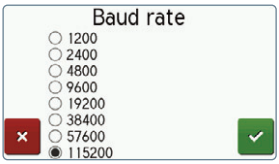
The other settings can be changed by tapping the pencil button .
One of four different input masks will be shown:

1. Slider

Tap and move the blue knob to change the value.
Save with button OK
Discard with button Cancel

2. Selection Menu

To select the desired setting, tap the corresponding line.
Save with the green button
Discard with the red button



3. Time Input

To change the time, the input field has to be cleared first with the CLR button. The new time can then be entered in the given format with colons as delimiters.
Accept with the green button
Discard with the red button

4. Date Input

To change the date, the input field has to be cleared first with the CLR button. The new date can then be entered in the given format with dots as delimiters.
Save with the green button
Discard with the red button

9.2 Network Settings

The currently active network configuration can be shown by tapping the Network button. The parameters “Use DHCP”, “IP address”, “Subnet prefix length” and “Gateway” can be adjusted by tapping the Edit button. You can obtain the correct parameters from your network administrator.

Note: If the parameter “Use DHCP” is enabled, all other parameters are automatically determined. The values set on the device will have no effect in that case.

All other settings, like “Hostname”, “Remote control port” and “Remote control password”, can be modified using the IMControl PC software.

9.3 Analog Output

Two values can be configured for the upper and the lower point of the analog output using the IMControl PC software:

1. the voltage value in mV
2. the ion concentration value in 1,000 Ions/cm³

Each channel (positive ions / negative ions) has a resolution of 4,000 increments (12 bit) for a voltage of 0 ... 10 volts and a current from 0 ... 20 mA, respectively. The set values apply to the negative and the positive channel.

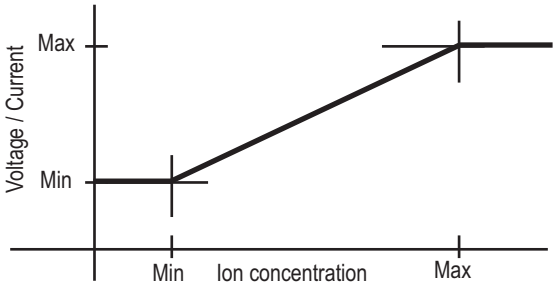


Figure 32 Chart of the output voltage

9. Configuration

Example configuration 1:
Intended configuration: 0 Volt (corresponds to 0 mA) should be output at 0 Ions/cm³; 10 Volts (corresponds to 20 mA) should be output at 10,000 Ions/cm³.
Set the following configuration:

1. Lower voltage value: **0** mV
2. Lower ion concentration value: **0 k**Ions/cm³
3. Upper voltage value: **10,000** mV
4. Upper ion concentration value: **10 k**Ions/cm³

Example configuration 2:
A current of 4 mA (corresponds to 2,000 mV) should flow at 5,000 Ions/cm³; a current of 20 mA (corresponds to 10,000 mV) should flow at 50,000 Ions/cm³.

Set the following configuration:

1. Lower voltage value: **2,000** mV
2. Lower ion concentration value: **5 k**Ions/cm³
3. Upper voltage value: **10,000** mV
4. Upper ion concentration value: **50 k**Ions/cm³

If the measurement is less than 5,000 Ions/cm³, 4 mA will flow at the output. If the measurement is greater than 50,000 Ions/cm³, 20 mA will flow.

Remark: 1 **k**Ions/cm³ corresponds to 1,000 Ions/cm³

Note: The pin assignment of the analog output is described in appendix A.

10. Information

This menu item shows information about the operating time, the calibration intervals and about the pre-amplifier.

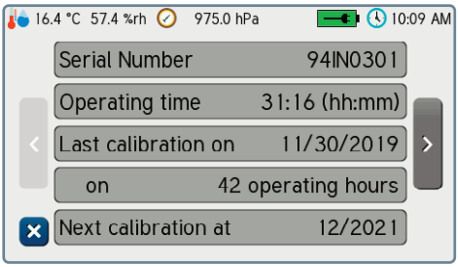


Figure 33 Example for the first information page

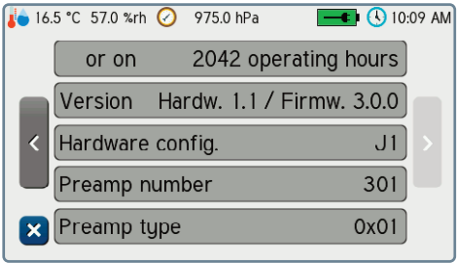


Figure 34 Example for the second information page

Tap the button to go back to the settings menu (Figure 30).

11. Service Functions

Three service functions are implemented in **IM806v3**:

11.1 Manual Operation

This service function allows to check the function of the fan and the lid servo. Tap the Service button in the settings menu (Figure 30) and then Manual Operation.

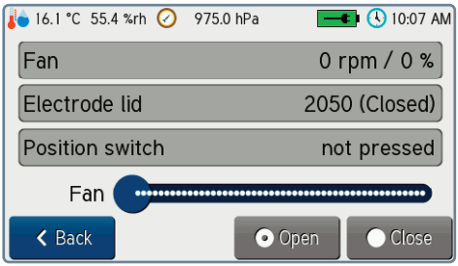


Figure 35 Service function for manual operation

The Fan slider can be used to change the set point of the fan. The power is shown in percent along with the fan speed. The lid servo can be driven accordingly with the Open and Close buttons. By tapping the Back button, the fan is stopped, the lid closed and the function is left.

11.2 Electrode Cleaning

Figure 36 Confirmation of the function “Electrode cleaning”

This service function switches **IM806v3** off with open electrode lid. Afterwards, the measuring electrodes can be cleaned. A corresponding service manual can be obtained from the manufacturer.

11.3 Touch Adjustment

To adjust the touchpanel, the touch adjustment service function is implemented. Three dots have to be tapped as precisely as possible. Afterwards, the result can be tested before saving. When touching the touchpanel, a crosshair is displayed. The crossing point represents the touching point. The adjustment data of the touchpanel can be saved or discarded.

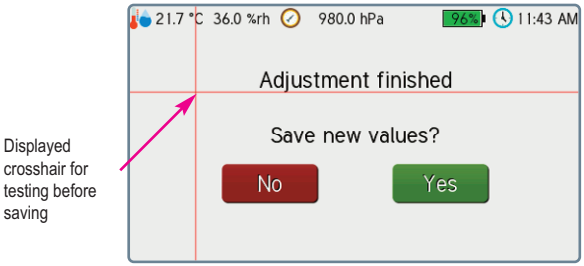


Figure 37 Touchpanel adjustment before saving

11.4 Service Info

Further information regarding the analog signals, the temperature and humidity sensor, the offset values determined by the zero adjustment as well as the licenses of the used software can be seen at this menu item.

12. Data Transfer

This function allows to copy the measurement files from the integrated microSD card in **IM806v3** onto an external USB memory stick. The function can be reached by tapping the Data Transfer button in the settings menu (Figure 30).

12.1 Copying Files

A list of the files that are currently present on the SD card is shown after starting the function:

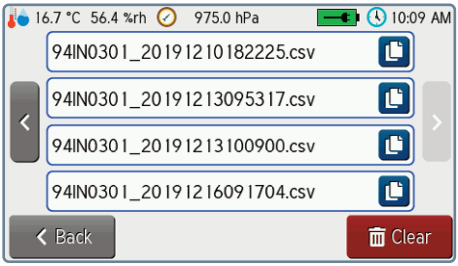


Figure 38 List of measurement files

The most recently created files are listed first. The button on the left of the screen can be used to browse to the older files.

By tapping one of the copy buttons , the corresponding file gets copied onto an attached USB memory stick into the directory "/measurement files".

The formats of the saved files and the file names are described in appendix B.

12.2 Deleting Files

By tapping the Clear button and confirming, **all** files on the SD card will be deleted. This operation cannot be undone.

Figure 39 Dialog to confirm the deletion of all data

13. Cleaning and Maintenance Instructions

Only clean **IM806v3** with a damp and lint-free cloth.

Do not use abrasives.

Do not exert pressure on the display glass.

13.1 Calibration and Maintenance Interval

The recommended calibration and maintenance interval is at every 2,000 operating hours of the fan or at least every 2 years.
The time until the next recommended calibration in shown in the information of **IM806v3** (Section 10, Figures 33 and 34).

Note

Charge the battery pack of **IM806v3** at least every 12 months with the included battery charger even when not in use.

14. Safety Instructions

Non-compliance with these safety instructions may lead to damages of the device and even to dangerous personal injury!

- **IM806v3 may only be used for the intended purpose!**
- **IM806v3 may only be used by qualified personnel!**
- **Prevent fluids from entering IM806v3 and the charger!**
- **Keep IM806v3 and the charger away from children!**
- **Avoid touching the display with sharp or pointed objects!**
- **The air has to be dry and free from oil or other substances which could accumulate dust particles on the walls of the electrodes!**
- **Therefore avoid measuring in atmospheres containing conductive dust particles such as graphite or similar materials!**
- **Avoid condensation of the air in the electrodes!**
- **Do not insert objects into the measuring system (tube electrodes)!**
- **Keep the electrode lid free! Risk of crushing!**
- **Do not use in areas with danger of explosion!**
- **Only use the charger in dry indoor areas!**
- **Do not use defective connection cables!**
- **Do not cover the charger during operation!**
- **Only use the charger to charge the integrated LiPo battery!**
- **The rechargeable battery pack and the battery must be disposed properly!**
- **Warning! IM806v3 is a Class A device. This device may cause radio interference in residential areas. In this case, the operator may be required to take appropriate measures.**

15. Technical Data

Measuring system:	Open measuring system with two electrodes arranged in parallel for simultaneous measurement of negatively and positively charged air ions. Servo-driven electrode lid.
Measuring scope:	Air ions with an ion mobility of 1.3 cm^2/Vs (small ions) and faster. Ions with lower mobility are detected partially.
Ion polarity:	Positively charged air ions, negatively charged air ions
Measuring ranges:	Eight measuring ranges: from 0 ... 1,000 Ions/cm^3 up to 0 ... 40,000,000 Ions/cm^3 automatic measuring range switchover
Volume flow:	24.5 l/min per channel (positively and negatively charged air ions)
Zero adjustment:	manually and automatically
Warm-up time:	min.: 30 seconds, typical: 15 minutes
Operating temp.:	0 ... 40 °C
Storage temperature:	-10 ... 50 °C
Measurement display:	Numeric display and graphical representation on illuminated display
Operation:	Touchpanel
Measurement storage:	Ion measurements (min., average and max. value), air pressure, temperature*, humidity*, device state onto integrated microSD memory card in CSV format. Data transfer via integrated FTP server, USB memory stick or PC software. * with optional temp. / humidity sensor
Self monitoring:	Battery voltage, fan speed

15. Technical Data (Continued)

Analog output:	One output per channel 0 ... 10 VDC / 0 ... 20 mA, lower and upper limits definable. Both outputs are galvanically isolated from the measurement device. Voltage output: min. input resistance of subsequent device: 10 kOhm Current output: max. load resistance of subsequent device: 400 Ohm
Power supply:	LiPo battery pack 14.4 Volts, 3600 mAh
Buffer battery:	Lithium button cell CR2032
Network services:	FTP, web and remote control server
Data storage:	integrated 1GB microSD memory card (for measurement and website files)
Dimensions:	1246 mm x 108 mm x 226 mm (W x H x D)
Weight:	3080 g
Housing:	Anodized aluminum profile housing
Tripod threads:	UNC 1/4 inch (Photo), UNC 3/8 inch (Microphone)
CE compliance:	Class A according to EN55011
Calibration interval:	after 2000 operating hours, at least every 2 years
Warranty:	24 months (limited to 12 months for battery and servo drive)

Charger:

Input voltage:	100 to 240 Volt, 50 to 60 Hz
Charging current:	2 A when quick-charging
Compliance:	CE, UL 60601

15. Technical Data (Continued)

Optional accessories:

Temp.- / humidity sensor:	rotronic Hygroclip2 (HC2A-S)
Extension tube:	Screw-on extension tube, Length: 119 mm (7.5 in)
Handling case:	systainer with PE foam cut-outs, available in light gray, anthracite, sapphire blue

Note: **Subject to technical changes**

16. Conditions of Warranty

Umweltanalytik Holbach GmbH grants 24 months (12 months for battery and servo drive) of warranty on this product after the date of purchase. In case of malfunctions of operation, please consult your dealer or supplier.
We reserve the right to repair or replace. The parts used for this are new or as good as new. Returned parts become property of Umweltanalytik Holbach GmbH. A repair under warranty does not extend the warranty of the parts or the products itself.
Excluded from warranty are damages caused by improper treatment, operational errors, misuse, external influences, lightning/surge, alterations of the product as well as added parts. Furthermore, consumable parts (e.g. batteries, fuses) as well as damages caused by consumable parts (e.g. by the leaking of batteries) are excluded. Also excluded are transport damage, subsequent damage, costs as a result of failure and travelling times. The warranty expires if repairs are done by non-authorized entities or if the serial number on the products is damaged or made illegible.
The warranty can only be claimed against presentation of an explicit receipt of purchase (invoice or sales receipt).
In case of warranty claim/repair, the device should be shipped carefully packed (if possible in its original packing and a shipping box) with a detailed description of the fault, sufficiently post paid to your dealer or to Umweltanalytik Holbach GmbH.
Shipments without freight prepaid will not be accepted.

Issued: 02/2020

17. PC Software IMControl

Delivery includes the IMControl software, compatible to Microsoft Windows 7 and above, on a data medium.

IM806v3 is connected via the USB interface.

17.1 Overview

The IMControl software can be used to:

- remotely control **IM806v3**
- configure **IM806v3**
- change the sequence control presettings (programs)
- display the current measurements of **IM806v3**
- export and transfer the measurement data from **IM806v3** to an EXCEL work sheet
- perform a firmware upgrade of **IM806v3**
- modify the adjustment data in **IM806v3**

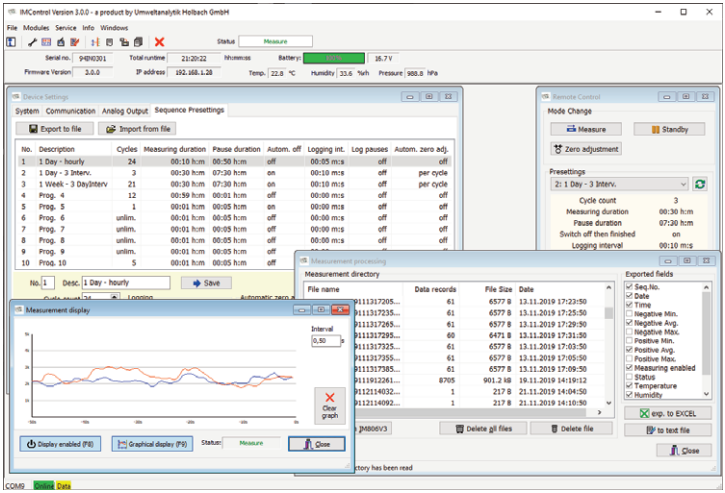


Figure 40 PC software IMControl

17.2 Installation of IMControl

The installation of IMControl is done by executing the installation program IMControl_Setup.

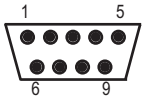
Start IMControl_Setup by double-clicking and follow the installation instructions. When the software is installed for the first time on a system, please make sure that the USB drivers are installed as well. On subsequent installations on the same system, it is not required to install them again.

The manual for IMControl can be found in the software itself under the menu item Info → User Manual.

Note: The IMControl software is only compatible to **IM806v3** and not to earlier models. Likewise, the preceding software IM806.exe cannot communicate with **IM806v3**.

Appendix A: Analog Output

A 9-pin Sub-MinD socket is available for the analog output on the back of the device.



View on connector

Figure 41 Layout of the pins, view onto the socket

The output signals are together galvanically isolated from the electronics of the device.

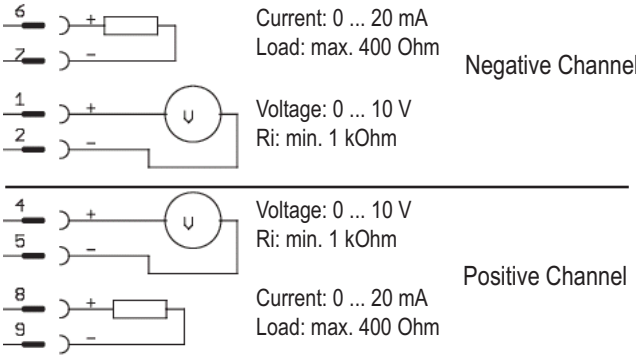


Figure 42 Pin assignment of the analog output

Appendix B: Structure of Recorded Data

Data is stored on the **IM806v3** as plaintext in CSV format. The fields are separated by a semicolon (;).

1. Date (Format: DD.MM.YYYY)
2. Time (Format: hh:mm:ss)
3. Minimum of the negative ion concentration in that interval
4. Average of the negative ion concentration in that interval
5. Maximum of the negative ion concentration in that interval
6. Minimum of the positive ion concentration in that interval
7. Average of the positive ion concentration in that interval
8. Maximum of the positive ion concentration in that interval
9. Measuring state: 0 = Measurement inactive, 1 = Measurement active
10. System state (0 = no errors)
11. State of the temperature / humidity measurement (1 = OK, 4 = no sensor detected)
12. Temperature value in 1/10 K (295.6 K are represented as 2956) or 0 if no sensor is detected
13. Temperature unit (0 = Kelvin)
14. Humidity value in 1/10 % (34.5 % are represented as 345) or 0 if no sensor is detected
15. State of the air pressure measurement (1 = OK, 0 = no sensor detected)
16. Air pressure in 1/10 hPa (973.8 hPa are represented as 9738)

The file name consists of the serial number of the **IM806v3**, followed by an underscore and the time stamp.

The timestamp has the format YYYYMMDDhhmmss.
Meaning of these format characters:

YYYY	Year
MM	Month
DD	Day
hh	Hour
mm	Minute
ss	Second

Appendix C: Extension Tube

The optional extension tube (Article no. 01-026E) allows for targeted intake of air. Due to the increased distance from the ionometer **IM806v3** it is possible to measure small air ion emitters without the influence of the ionometer **IM806v3**.

Figure 43 Extension tube

The two anodized aluminum tubes are electrically connected to one of the knurled thumb screws. This allows to discharge static charges through the housing of **IM806v3**. Use the included grounding cable for that.

Mounting the extension tube:

Screw the extension tube to the side panel with the inlets (Figure 44) using both knurled screws. Only tighten the screws hand-tight. Both tubes get electrically connected to the housing through the screws when attached.

Appendix C: Extension Tube

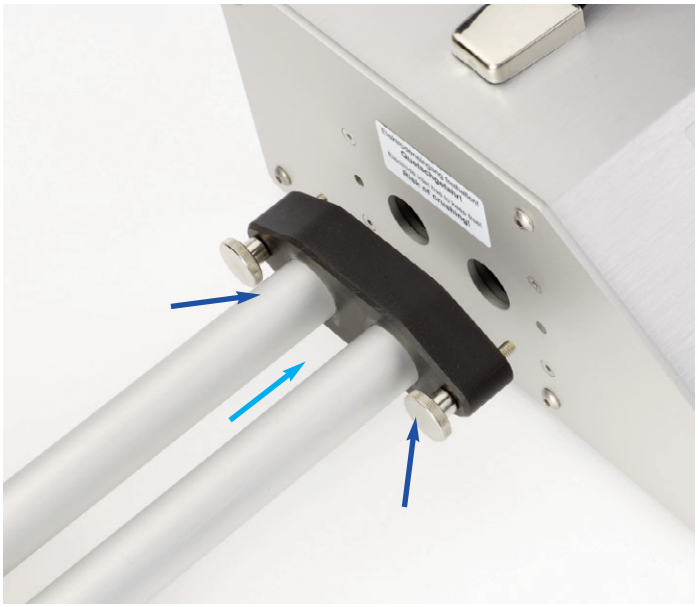


Figure 44 Mounting of the extension tube to the ionometer

D

Safety instruction: Never touch live parts with the tubes!
Risk of short-circuit!!

Appendix D: Network Services

The ionometer **IM806V3** offers a web server, an FTP server as well as a remote control server on its network connection.

1. Web Server

The web server of **IM806V3** can be reached on the default port 80 with common web browsers. Example files that allow querying the measurements and the system configuration are pre-installed on delivery.
The files for the web server are located on the integrated microSD card in the folder “/web” and can be modified to your needs via FTP.
The current measurements and the system configuration are available over a JSON-API on the path “/api”. The usage of the API is demonstrated in the example files.

2. FTP Server

The FTP server allows to access the contents of the integrated microSD card. It can be reached on the default port 21 with common FTP software.
The user name for the login is “user”. The preset password is printed onto the sticker in the back of this operating manual. This password can be changed using the IMControl PC software. If an empty password is set, the password query on connection is disabled.

3. Remote Control Server

The remote control server allows to control the ionometer **IM806V3** over a TCP connection with the same commands as for the USB and serial connection. However, the correct password, if set, has to be sent prior to the first command.
The port is preset to 8063 and can be changed using the IMControl PC software. The preset password is printed onto the sticker in the back of this operating manual. This password can also be changed with the IMControl PC software.

Appendix E: Declaration of CE Conformity

holbach
UMWELTANALYTIK

EG – Konformitätserklärung
DECLARATION OF CONFORMITY (DoC)

Name und Anschrift des Herstellers *Name and address of the manufacturer*	Umweltanalytik Holbach GmbH Sperberweg 3 66687 Wadern Germany
Telefon *Phone*	+49 (0)6874/182277
E-Mail	info@holbach.biz
Gegenstand der Erklärung *Object of the declaration*	Ionometer **IM806v3** *Ionometer* **IM806v3**

Das oben genannte Produkt erfüllt die wesentlichen Anforderungen, die in der Richtlinie 2014/30/EU zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit festgelegt sind.
The above mentioned product complies with the essential requirements, which are specified in the directive 2014/30/EU on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Das Produkt aus der oben beschriebenen Erklärung stimmt mit den Anforderungen der folgenden Spezifikationen überein:
The product of the declaration described above is in conformity with the requirements of the following specifications:

Dokument : Ausgabe *Documents-No: Date of issue*	Titel *Title*
EN 55011: 2009 + A1: 2010 Klasse A	Industrielle, wissenschaftliche und medizinische Geräte - Funkstörungen - Grenzwerte und Messverfahren *Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement*
EN 61326-1:2013	Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen *Electrical equipment for measurement, control and laboratory use - EMC requirements*
EN 61000-3-2: 2006 + A1: 2009 + A2: 2009 EN 61000-3-3: 2008 EN 61000-4-2: 2009 EN 61000-4-3: 2006 + A1: 2008 + A2: 2010 EN 61000-4-4: 2004 + A1: 2010 EN 61000-4-5: 2006 EN 61000-4-6: 2009 EN 61000-4-8: 2010 EN 61000-4-11: 2004	Elektromagnetische Verträglichkeit (EMV) *Electromagnetic compatibility (EMC)*
DIN EN 61010-1: 2011	Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte *Safety requirements for electrical equipment for measurement, control and laboratory use*

Verantwortlicher: Helmut Holbach,
Identity of responsible person: Geschäftsführer, *General Manager*

Unterschrift:
Signature

Datum: 05.12.2019
(Date of issue of the DoC)