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1. The Ionometer IM806

You have decided on our Ionometer **IM806**.

Therefore thank you!

The portable Ionometer **IM806** was developed for the continuous measurement of the concentration of positively and negatively charged ions in the air.



Fig 1 The Ionometer **IM806**

The **IM806** features:

- The simultaneous measurement of both ion polarities (positive and negative)
- A wide range of measurement from 0...1,000 ions/cm³ in the smallest range up to 40,000,000 ions/cm³ in the largest range
- Integrated data logger with additional saving of readings (SD memorycard)
- Integrated FTP-Server to download the readings and a web-server to show readings via network
- A servomotoric driven lid
- Electrically isolated and configurable analog line-outs 0...10 VDC and 0 ... 20 mADC for every polarity



2. Contents of the package

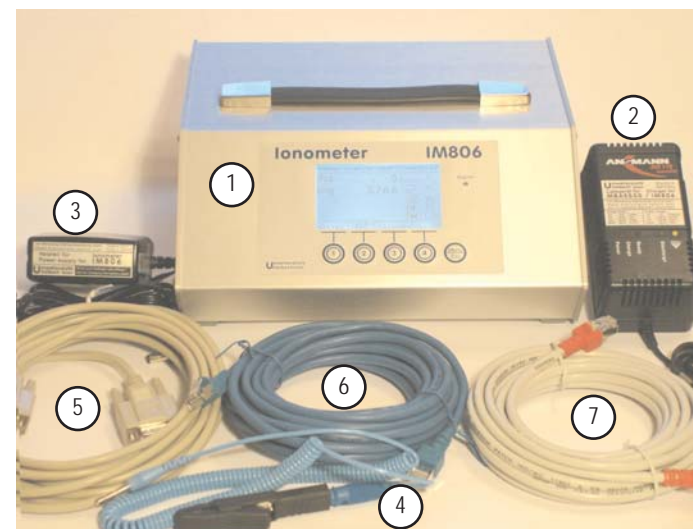


Fig. 2 Contents of the package

Contents of the package:

1. the Ionometer **IM806**
2. the battery charger
3. the power supply unit for permanent running
4. a spiral wire with alligator clip to drain off charges
5. a serial cable, 5m, SubMiniD 9 Pin Plug,
6. a network cable (blue), 5m, as a connection to the network (hub, switch, network socket, etc.)
7. a crossover-twisted-pair cable to connect to a PC network connector
8. the software for the set up and data- processing of the **IM806**, running under Microsoft Windows 2000, XP (not pictured)
9. this owner's manual (not pictured)

3. The principle of measurement of the IM806

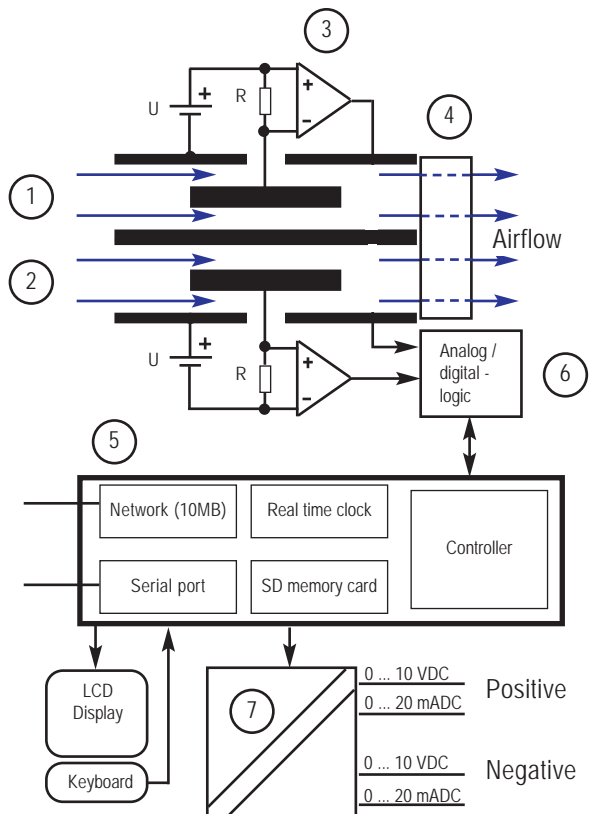


Fig. 3 The principle of measurement of the IM806

The Measuring-System is built up of two external tubular electrodes (1 and 2) with a smaller electrode each centrally and electrically isolated mounted within. Between the electrodes a DC potential is applied. This creates an electric field between the electrodes. The ventilator (4) draws air continuously at a defined volumetric quantity through the tubes. The electric field between the electrodes deflects the ions in the passing air to the inner electrodes. Because

there are two different polarities in the tubes (positive and negative), the positively charged ions will be accelerated in the one tube and the negatively charged ions will be accelerated in the other tube. The flow speed of the air, the value of the deflection voltage and the geometry of the tube are determined in a way that the ions with a defined minimum mobility reach the inner electrode. Slower ions reach the inner electrode only partially.

At resistors (R) of high impedance (up to 10^{11} Ohm) the charging current generated by the charge neutralising will lead to a measurable voltage which can be measured with the adequate amplifier (3). This signal, which is proportional to the concentration of ions in the air is then be digitalised in the preamplifier.

The operation is run by a microcontroller (5) which also processes the LED, the logic memory, the analog line-outs (7), the serial interface and the network interface.

4. Control elements

4.1 Keys and Display in Front

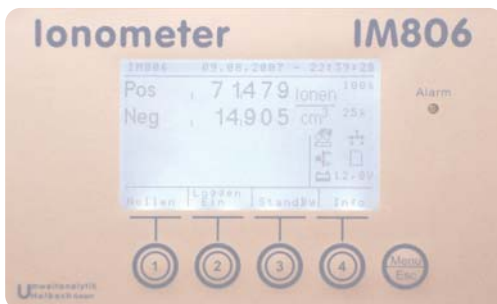


Fig. 4 Keys and display

In front, there is a keypad with the keys 1 to 4 and the Menu/Esc-key. The lit LCD-display is above the keys.

The display is departed into 4 sections:

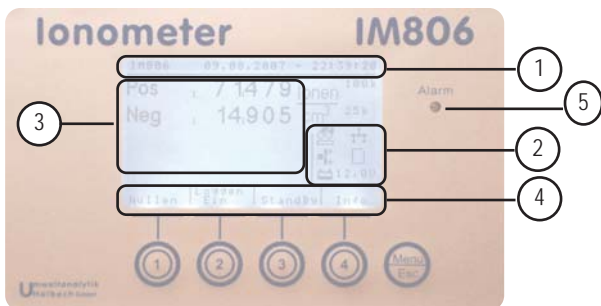


Fig. 5 The sections of the display

1. the head with the current system-date and -time. A hint will be displayed in the test-mode.
2. the symbol section for fast orientation on the condition of the peripheric units (battery, lid, network, etc.). The symbol section can also be blanked out (for lists, zero point calibration, etc.).

3. the display section with the chosen mode-display, for example operational mode measurement readings. Furthermore, in active data logging, additional informations will be displayed. The display section can cover the symbol section depending in the operational mode.
4. the key section with the meaning of the softkeys below. Text and symbols are used

The **Menu/Esc** key has got several functions. There is also a difference between short operation and long operation:

- in **list or sub-menus**, the **short** operation takes you one step back to the superior menu or to the previous active function (measuring, stand by, zero calibration).
- **inside the main function** (warm-up, measuring and stand by), a **short** operation shows the set-up. The shown set-up can be edited with the set-up program IM806.exe
- **inside the main function** (warm-up, measuring and stand by), a **long** operation shows the set-up.



Hint: Prss the keys fast and precise.

Do **NOT** use sharp subjects for operating the keys. They might be damaged.



Alarms are signaled by a red (ultrabright) LED (5) right next to the display. Furthermore, the LED shows the function during a program-update.

By turning on the **IM806**, the LED shines until the end of the initialization of the device. In stand-by-mode, the LED blinks periodic.


Attention:

The LED is very bright - do not look directly into the LED!



The display section signals with symbols the current operating condition and upcoming malfunctions.


Following symbols can be shown:

 **Malfunction: Set-up incorrect**
The set-up data is saved on a non-volatile memory (EEPROM). By using a check sum, errors can be identified. Check the set-up and save a set-up date.




 The electrodes are closed, respectively not fully opened.

 The lid is closing/opening


 The lid is fully opened


 **Malfunction: The lid is defective**


Check if the lid is free, and not blocked.


 **Malfunction: The network interface could not be initialized.**
No FTP-function, no web-function possible.


 The network interface could be initialized.

 The automatic zero calibration is activated. **IM806** is going to perform a zero calibration at well-defined intervals.

 **Malfunction: The data in the real time clock is not consistent.**
Check date and time, do a zero calibration. If the malfunctions occur more frequently, the buffer battery has to be changed

 **Malfunction: The fan is not working.**
Check if the rotor is blocked.

 The fan is turned off. The fan is turned on during the zero calibration and the stand-by mode.


 The fan is turned on and the rotor turns.

 **Malfunction: The SD memory card could not be integrated in the system during start-up.**


 The integrated SD memorycard could be initialized.

 Data is logged on the SD card

 **Malfunction: The integrated battery is completely discharged. Charge the battery immediately!**

 The battery is discharged. Ca. 10 more minutes of measuring operation are possible. Charge the battery.

 The battery capacity lasts for 1 to 2 hours of measuring operation.

 The battery capacity is in the upper half. 3 to 6 hours of measuring operation can be achieved.

Note: Details on the operating time are reference values and are only valid if the battery was previously fully charged.



4.2 Control elements on the back

The main switch is on the back:

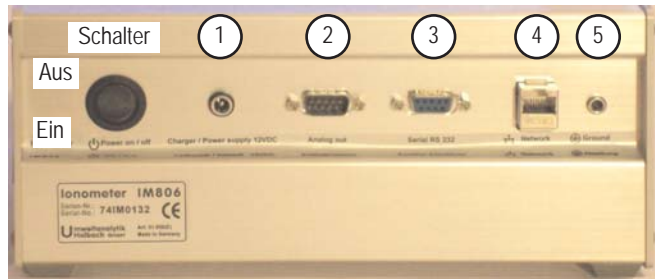


Fig 6 Main switch and plug ins on the back

Hint: Put the device in stand-by mode before turning it off, in order to close the lids.



5. The plug-Ins on the back

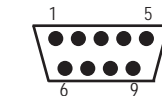
The plug-ins are on the back in a recess:

1. The charger plug-in for the connection to the battery charger and the power supply (2, 1 mm low voltage socket, Plus in the middle)
Only connect the recommended devices and follow the safety instructions!
2. Analog line-out (9 pin SubMinD)
3. Serial connector according to RS232, (9 pin SubMinD socket)
4. Network connector (RJ45 socket)
5. Socket for the charge equalization (4 mm socket)

The connector configuration of the sockets is explained on the following page.

5.1 Analog Line-Out

The readings are also available as analog voltage signals for the connection to a writer, a control device, or a data logger. The set-up is explained in the chapter "set-up".



View on connector

Setting of the connectors. Top view on the multi-pin connector

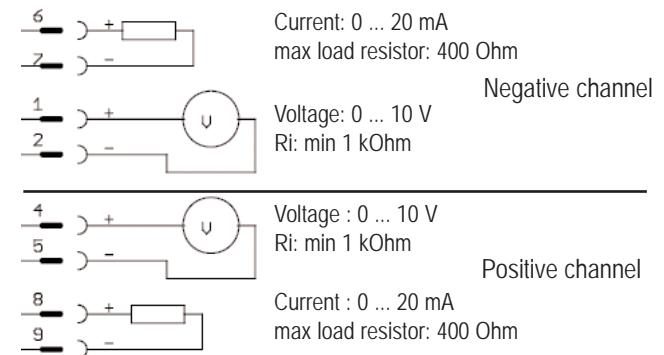
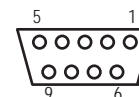


Fig. 7 Connector Configuration of the Analog Line-Outs

5.2 Serial Connector

The serial connector is for the connection to a PC. The configuration is not norm consistent, but allows the use of a 9 pin cable 1:1



View on connector

Used Pins:
Pin 2: TX (Transmitter)
Pin 3: RX (Receiver)
Pin 5: Ground

6. The tripod sockets

The Ionometer **IM806** has two tripod sockets underside the device:

- 1/4 Zoll UNC (picture tripod)
- 3/8 Zoll UNC (microphone tripod)

Notes:

The screw-in depth of the tripod screw must not exceed 8 mm, since the screw comes out inside the device and can cause therefore severe damage.

Only use tripods that can carry the weight of the device.

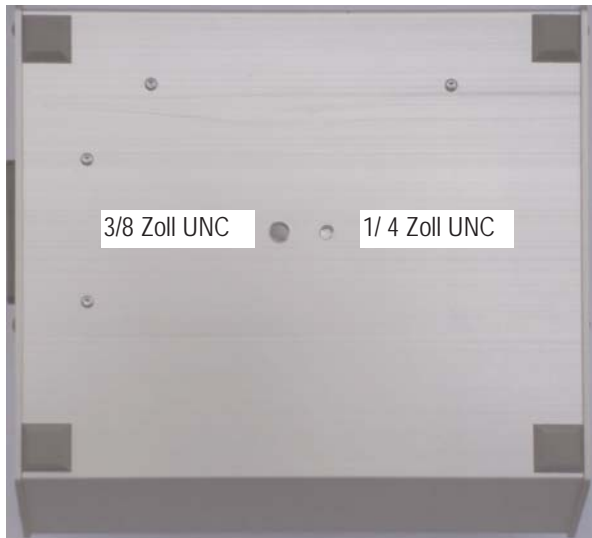


Fig. 8 The tripod sockets

7. Battery charger and Power supply**7.1 The battery charger**

The battery charger is exclusively meant for charging the integrated NiMH-battery (12 Volt/3000mAh).

The battery charger can be run on the grid-side with a voltage from 100 volt to 240 volt and with a frequency from 50 Hz to 60 Hz. With the provided plug-adapters Euro US, UK and Australia, you can use the **IM806** almost all over the world.

Put the right plug-adaptor in the battery charger according to paragraph 7. 1. 1.

Plug the low voltage plug of the battery charger in the charging socket of the IM806.

Put the battery charger in the socket outlet. The red LED "Power" shines. 3 seconds later, the LED "Charge" begins to shine. 3 seconds later, the green LED "Ready" blinks for about 1 minute. During this time, the battery is checked. Then, the green LED expires for the duration of the charging process. If the LED "Charge" does not shine or blinks together with green LED "Ready", there might be an error in the battery or an error in the polarity.

Is the charging process completed, the charger switches on pulse trickle charge automatically, the green LED "Ready" shines for about 2 minutes permanent and then starts to blink. The red LED "Charge" expires. The charging condition is controlled by a micro-controller during the whole charging time. Securitysteps like voltage gradient control, delta-voltage-shut-down and security shut-down are integrated in the battery charger.

Optional, the battery can be well-defined discharged before the actual charging process by operating the yellow key. During the process of discharging, the yellow LED "Discharge" shines.

Is the battery fully discharged, the charging process takes about 5 hours.

7.1.1 Changing of the Plug-Adapter

Unplug the low voltage plug from the IM806 and pull the battery charger from of the mains socket.

Push the latch with the label "Open" in the direction of the adapter (fig. 8). After opening the latch, the adapter is pushed off the battery charger with spring tension. Then put the desired plug adapter on the battery charger and push the adapter into the device until the plug adapter clicks in with an audible click.



Fig. 9 Changing of the plug adapter

Notes::

When you run the Ionometer **IM806** during the charging process, attach the charge equalization because of the capacitive coupling to the mains.

With the first uses some smell might develop. Please ventilate the room accordingly



7.2 The Power Supply

The power supply is always then necessary, when the given battery capacity is not sufficient for the planned duration of the measurement.

The power supply can be run on the grid-side with a voltage from 100 volts to 240 volts and with a frequency from 50 Hz to 60 Hz. With the provided plug-adapters Euro US, UK and Australia, you can use the IM806 almost all over the world.

The output voltage is 12 volt. The maximum output-power is 850 mA.

Notes: If the battery voltage by use of the power supply is higher than 12 volt, the battery will discharge just up to this voltage.

By using the power supply, attach the charge equalization because of the capacitive coupling to the mains.



7.2.1 Changing of the Plug-Adapter

Unplug the low voltage plug from the **IM806** and pull the power supply from the mains socket.

Push the button beneath the power supply adapter and slide the power supply adapter to the top until the stop (ca. 3mm). Now you can remove the power supply adapter. Then put the desired plug adapter on the power supply adapter and push the adapter into the device until the plug adapter clicks in with an audible click

7.3 Safety instructions for the Use of the Battery Charger and the Power Supply

- Only for interior use in dry conditions!
- Do not use in rooms with danger of explosions!
- Only use the charger for charging NiCd and NiMH batteries!
- The battery is obligatory to dispose!

8. Operation of the IM806**8.1 Turn-On Procedure**

Operate the rocker of the main switch in the lowest position.

In the activated program-update-function, a sound taking about 0, 5 seconds emerges, or two short sounds in a row.

The red LED shines. On the display appears **IM806** with the initialization hint. The display lighting is initially 5 (medium brightness). The SD card and the interfaces (network, serial interface) are initialized.

After ca. 5 seconds another signal sound emerges, the brightness adjusts to the set up degree. Another graphic is shown. This graphic is configurable and saved on the SD memorycard.

The display shows the program versions of the Ionometer and of the operating system.

After another 5 seconds, the first operating mode "warm up" is initialized. This mode is only activated during the turn-on procedure and in case of malfunction.

The warm-up takes 20 seconds. While the countdown of the balance time, the following functions are possible:

Key 1: Starting the zero point calibrating (zeroing)

Key 2: Starting the measuring process

Key 3: Starting the stand-by mode

Key 4: Display of the system notices

Key Menu/Esc short: Display of the set-up

Key Menu/Esc long: Opening the set-up menu

When the warm-up is completed with the activated function "zeroing at start-up" or "automatic zeroing", the zero point calibrating will actuate. Otherwise, the measuring process starts

8.2 Measuring

When starting the operational mode "measuring", the lid opens. Is the lid fully open, the ventilator turns on. Shortly after, the readings are shown in the display.

The keys have the following functions:

Key 1: Starting the zero point calibrating (zeroing)

Key 2: Logging the readings in/out

Key 3: Starting the stand-by mode

Key 4: Display of the system notices

Key Menu/Esc short: Display of the system-info list

Key Menu/Esc long: Opening the set-up menu

At this point, there is some general information on measuring air ions.

Every electric field affects air ions and distracts them. Is the Ionometer **IM806** isolated and charged through coupling, it has an influence on the surrounding air ionization. Because of that, less ions get into the tube. This leads to a lower reading.

In order to avoid this effect, the charge should be drained off with the provided cable. Plug in a 4 mm laboratory plug into the socket of the IM806 and connect the other connector with an earth connected electrical connector.



Avoid plastics that can be charged electrostatically in the surroundings of the tube.

8.3 Data logging

The data logging can be activated:

- by the set-up of a date and enabled time control (paragraph "set-up")
- by operating key 2 ("Logging In")

In the display, a hint is given below the readings.

The set-up logging clearance and the logging duration are shown in the system notices (Key 4 "Info").

The readings are logged in the given clearances.

One set of data contains the following sections, separated by ";":

1. Date
2. Point in time of the logging
3. Minimal value of negatively charged ions in this clearance
4. Gliding average value of the negatively charged ions in this clearance
5. Maximum value of the negatively charged ions in this clearance
6. Minimal value of the positively charged ions in this clearance
7. Gliding average value of the positively charged ions in this clearance
8. Maximum value of the positively charged values in this clearance
9. System state (0 = no malfunction)

The filename consists of the following components:

IM_MMDDhhmmss.CSV

The marks in italics are placeholders and mean:

MM: Month, *DD*: Day, *hh*: hour,
mm: minute, *ss*: second

for example:

Date;Time;NegMin;NegAvg;NegMax;PosMin;PosAvg;PosMax;State
23.07.2007;23:54:26; 543; 543; 543; 748; 748; 748;0
23.07.2007;23:54:56; 298; 827; 1194; 427; 933; 1191;0

The files can also be read out with an FTP-Client via the network.

A running data logging can be finished:

- at arriving at the set-up logging duration
- by operating key 2 ("Logging Out")

Note: If you have more than 50 reading files on your SD memory-card, it takes the system up to 4 seconds to create a new file.



8.4 Zero point calibrating (zeroing)

In order to avoid offset values of the different parts in the input amplifier metrological, a zero point calibration is necessary. Because of the offset values' dependence on temperature, the warm-up should be completed before doing the zero point calibration.

Zero point calibration is activated:

- after the warm-up through the set-up "zeroing at turn-on procedure"
- In well-defined clearances, if "automatic zeroing" is activated.
- By operating Key 1 ("Zeroing")

Procedure of the zero point calibration:

The tubes are being closed.

For each of the eight measurement ranges, the necessary offset voltage is set, checked and corrected, if necessary.

The offset values are shown in the display.

A zero point calibration takes between 2 and 5 minutes.

The zero point calibration interrupts the data logging, but does not end it.



Note: After an initial running for about 5 minutes, a new zero point calibration is only necessary at a measurement of a small concentration of ions (<500 Ions/cm³).

8.5 Stand-by Mode

The Ionometer IM806 can be put in stand-by mode during the time of the measurements or during the set-up.

The stand-by mode is activated:

- by operating key 3 ("Standby")
- automatically, when the battery has reached the lowest threshold

In stand-by mode is

- the fan turned off
- the tubes closed
- the display lighting turned off

To avoid a mix-up with the turned off Ionometer **IM806**, the LED flashes every 5 seconds.

The number of flashes per clearance gives information about the charging condition of the battery. If the battery is fully charged, there are only 4 flashes.

If the discharging threshold of the battery is reached, an additional acoustic signal is heard every minute.

This is how you end the stand-by mode:

Press any key. The display lighting turns on. Choose the desired function within 6 seconds:

Key 1: Starting the zero point calibration

Key 2: Starting the measuring process

Key 3: Starting the stand-by mode

Key 4: Display of the system notices

Key Menu/Esc short: Display of the system-info list

Key Menu/Esc long: Opening the set-up menu

If you do not press any other key within 6 seconds, the **IM806** stays in stand-by mode.

The end of the stand-by mode is also achieved by starting a set-up data log.



Note: Activate the stand-by mode always before you shut down the Ionometer **IM806**. The tubes are closed then and protected from any unnecessary dirt.

**8.6 System-Messages**

Events like the end of a data logging or alarms are written into system message list.

This list contains the last 25 messages since program start.

The number of messages and alarms is given in the headline of the list.

Alarm messages are shown inverse.

The display of the list is activated by operating key 4 ("Info").

Are there more entries than can be shown on the display, you can use the keys 1 and 2 (arrows up and down) to scroll through the list. If the arrow is inverse, the end of the list is reached.

The keys have the following functions:

Key 1: Scroll towards the top of the list

Key 2: Scroll towards the bottom of the list

Key 3: Delete all entries

Key 4: End list function

Key Menu/Esc short: End list function

Key Menu/Esc long: No function

If no key is pressed in the list function within 60 seconds, this function ends.

8.7 Alarm-Messages

During operating, the peripheric units like fan and battery voltage are controlled continuously. In case of a failure, alarm is released.

The LED shines and, if the set-up "beep on event" is activated, a sound signal is activated as long as key is pressed.

To end the alarm message, press key 3 ("continue").

The alarm event is entered in the message list.

If no key is pressed in the alarm message display within 3 minutes, the alarm message display turns off automatically.

9. The set-up of the IM806**9.1 Via PC Software changeable set-up**

Certain set-up parameters are not very comfortably adjustable with the 4 possible keys.

That is why the Ionometer itself is done without any possibilities to change. These set-up parameters can be set easily with the provided software via the serial interface.

The actual set-up of these parameters is given on the system info list.

Activate the system info list by operating shortly the key Menu/Esc.

The following system information and set-up parameter is shown:

Serial-Nr.	Systeminfo	
Operation time	Systeminfo	
IM806 Version	Systeminfo	Version of the control programs
OS-Version	Systeminfo	Version of the operating system
Hostname	Parameter	
IP-Address	Parameter	Network adress
Netmaske	Parameter	Network Mask
Gateway	Parameter	Address of the next Routers
MAC-Adresse	Systeminfo	worldwide unique Network-Hardware-Adress
TFTP-Server-IP	Parameter	Networkadress of the Server from which the program update can be downloaded
Analog-Line-Out-Min	Parameter	see paragraph 9.1.1
Analog-Line-Out Max	Parameter	see paragraph 9.1.1
TFTP Freigabe	Parameter	release for program update
Calibration on:	Systeminfo	Date until the next calibration
Calibration in:	Systeminfo	still available operation hours until next calibration

The calibration is necessary every 2 years or every 2000 hours of operation. The first reached event counts.

9.1.1 Set-Up Analog-Line-Out

For the analog line-out, 4 parameters are to be defined:

1. the lower voltage value in mV
2. the lower ion concentration value in klonen/cm³
3. the upper voltage value in mV
4. the upper ion concentration value in klonen/cm³

Every channel (positive ions/negative ions) has a resolution of 4000 increments (12 Bit) for a voltage of 0 ... 10 volt respectively a current from 0 ... 20 mA.

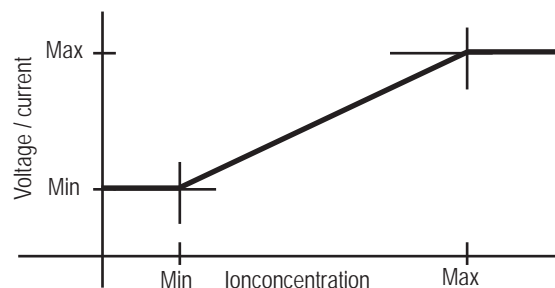


Fig. 10 Chart of the analog line out voltage

The setting counts for the negative and the positive channel.

On the following page, there are two examples of set-ups.

Example 1:

Reference set-up: at 0 ions, 0 volt should be released, at 10,000 ions/cm³, 10 volt (equals 20 mA) should be released.

Do the following adjustment:

1. the lower voltage value: 0 mV
2. the lower ion concentration value: 0 Ions/cm³
3. the upper voltage value: 10,000 mV
4. the upper ion concentration value: 10,000 Ions/cm³

A resolution of 2.5 ions / increment is achieved.

Example 2:

The range of interest runs from 5,000 ions up to 50,000 ions/cm³. at 5,000 ions, 4 mA (equals 2,000 mV) should flow, at 50,000 ions/cm³, 20 mA (equals 10000mV) should flow.

Do the following adjustment:

1. the lower voltage value: 2,000 mV
2. the lower ion concentration value: 5,000 Ions/cm³
3. the upper voltage value: 10,000 mV
4. the upper ion concentration value: 50,000 Ions/cm³

A resolution of 14 ions / increment is achieved.

If less than 5,000 ions/cm³ are measured, 4 mA are released at the line-out. If more than 50,000 ions/cm³ are measured, 20 mA are released.

9.2 The Set-Up Menu

Activate the system info list by operating **long** the key Menu/Esc.

The following adjustments can be done:

1. Display brightness selection screen from 0 to 10
2. Beep on key selection screen On / Off
3. Beep on events selection screen On / Off
4. System Date / Time inputmask Date / Time
5. Logging mode: selection screen: Off/ Time / Time
and Zero point calibration
6. Starting Datalogging: inputmask: Date / Time
7. Duration Datalogging: inputmask: Duration
8. Logging Clearance: inputmask: Time
9. Automatic zeroing: selection screen: On / Off
10. Clearance automatic
zeroing: inputmask: Time
11. Zero point calibration after turn
on procedure: selection screen: On / Off
12. Baud rate serial connector selection screen
13. Language selection screen: German / English

In order to change a parameter, put the selection bar (inverse shown line) with the keys 1 and 2 (arrowkeys) on the parameter text and press key 4 (return key).

In the selection menus, you make your choice the same way. After the selection you return to the set-up menu.

If you do not want to select, press the key menu/Esc and you get back to the set-up menu.

The date- and time-input can be changed by operating the keys 1 and 2 (arrowkeys). By operating key 3 (arrow right), you reach the next section (month/ year/ hour, etc.). the current section is shown inverse. By operating key 4 (return key), the changes are accepted, with the key menu/Esc you return without any changes of the parameters back to the set-up menu.

10. The program IM806.EXE

With the in the package included program IM806.EXE, you can set-up and handle comfortably your Ionometer **IM806**. The program runs under Microsoft Windows 2000 / XP.

10.1 Installation

Copy the directory English\IM806 with all the subdirectories on the hard drive.

Create a shortcut to the file IM806.EXE on your desktop and/ or in your quickstart bar.

Connect the Ionometer IM806 through the provided serial cable with the serial interface on your PC.

Start the program IM806.EXE.

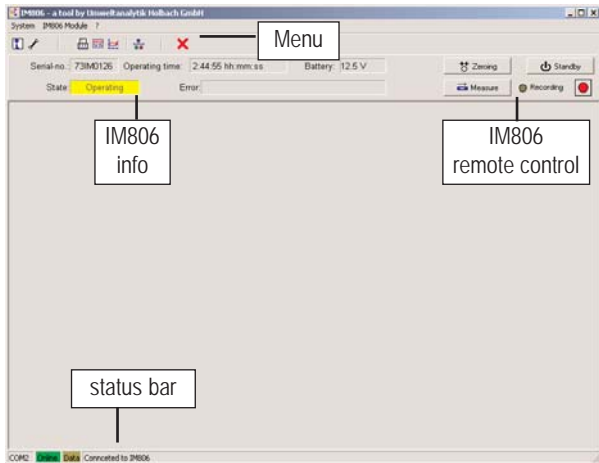


Fig 11 The program IM806.EXE

When starting the program, the program settings are read from the set-up file IM806.INI.

If it was not possible to read all parameters at the program start, this will be shown.

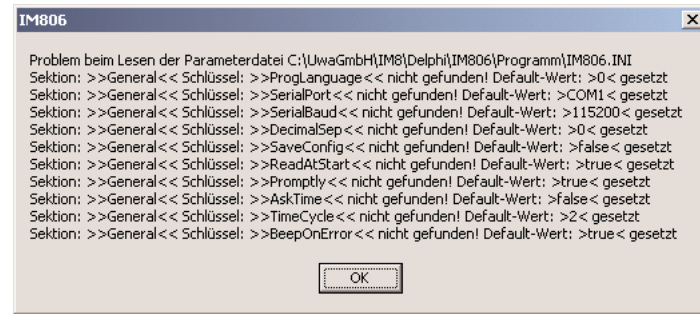



Fig. 12 Hint, if program parameter cannot be read

In order to set-up the program, activate the menu point "system -> program parameter or click the button:  with the left mouse-button.

A form opens for the program settings:

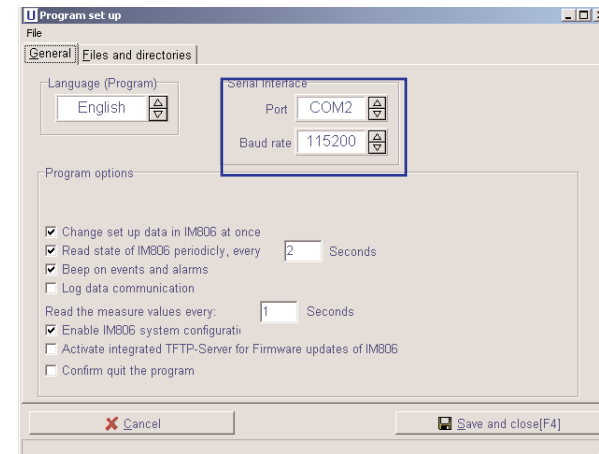


Fig. 13 Form for program settings

Turn on the attached serial port.

The Baud rate must comply to the Baud rate of the Ionometer IM806. You can change the settings by clicking the little arrows. Confirm the changes by clicking button "Save and Close".

If the connection is successful, the status bar shows the green online field. The serial-nr., the operating time, the battery voltage and the state of operation of the attached **IM806** are shown in the **IM806**-Info section.

If the connection to the **IM806** fails, you need to check the following:

1. Is the **IM806** turned on?
2. Is the connecting cable plugged in right in the Ionometer's socket "serial socket" and in the serial socket on the PC?
3. Is the right serial port turned on in the program settings?
4. Do both baud rates comply, the set-up one and the one of the **IM806**?

10.2 Operation

System notices from the program or the **IM806** are shown in a separate system notice window. At alarm notices, the window opens automatically. It can be faded in and out by operating the key F2.

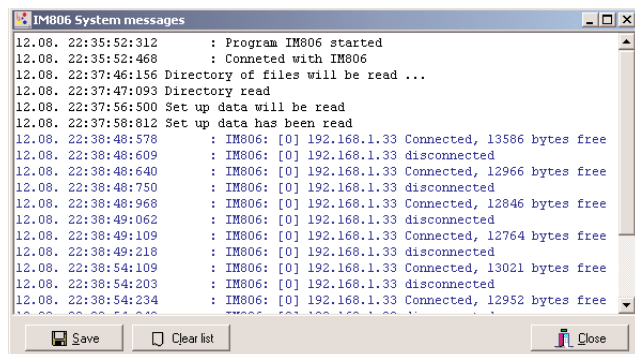


Fig. 14 System messages

Notices of the program are shown in black color, notices from the **IM806** in blue color and error notices of the program are shown in red color.

You can save the notices in a text document and you can also delete them.

In the upper right area of the program mask, you can remote control the **IM806** by operating the right keys.

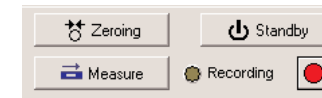




Fig 15 Remote control of **IM806**

You can activate 4 modules for the settings and the data take-over via the menu point "IM806 Module". Position and size of the modules will be saved.

In the module "IM806 Settings", all those settings can be done which you can also set on the **IM806**. Furthermore, you can also set-up here the analog line-out of the **IM806**.

If the setting "perform set-up changes immediately in the IM806" in the program is activated, then, after leaving the input field in the module (by operating the Tab or Enter key), the new value is transferred to the **IM806** and is effective. That does not count for the settings of date and time.

You can read the current set-up with the button "Read from IM 806" and transfer all settings to the **IM806** with the button "Write in IM806".

In every module, the buttons with the symbol  have the reading of the parameter as a consequence and the buttons with the symbol  have the writing of the parameter as a consequence.

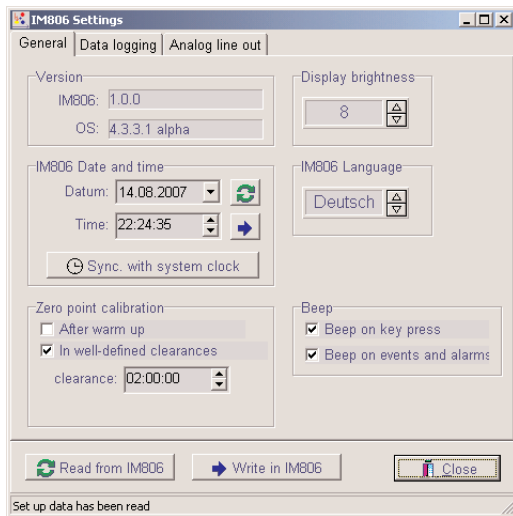


Fig 16 Module **IM806** Settings

The module "IM806 reading display" shows the actual reading of the IM806. If the module is changed in size, the display size changes, too.

The display only occurs in the operational mode "measuring", The display can be activated and deactivated by operating the key [F8].

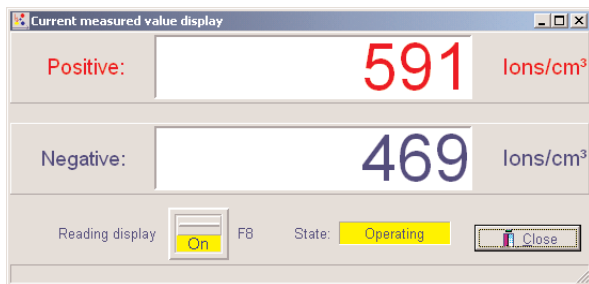


Fig. 17 Module **IM806** reading display

With the module "IM806 data export", saved data can be read in the **IM806** and then be exported into a text file or in an EXCEL file, showing a diagram.

In the program settings, an EXCEL template file can be selected. After generating the diagram, the EXCEL-macro "IMStart" is opened. So, the data of the measurement can automatically be processed.

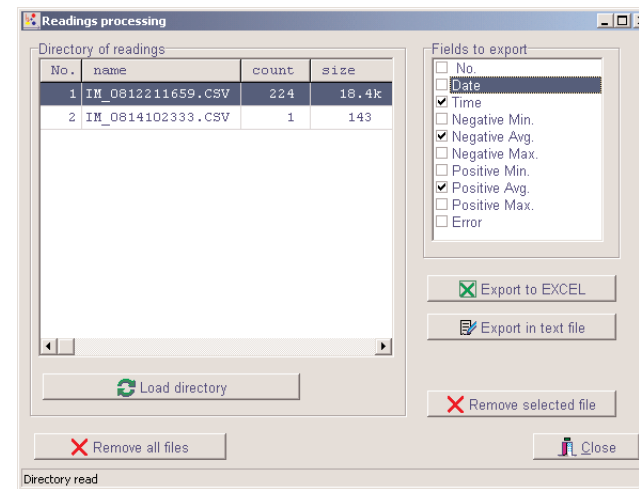


Fig. 18 Module **IM806** Data import

Load the reading directory first.

Select the reading file you want to export.

Choose the fields you want to export from the choosing window.

Start the export to EXCEL or to a text document

Note: Large files (more than 500 reading sets) can be transferred faster via the FTP-Client.

In this module, you can also delete single reading files or all the reading files from the **IM806**.

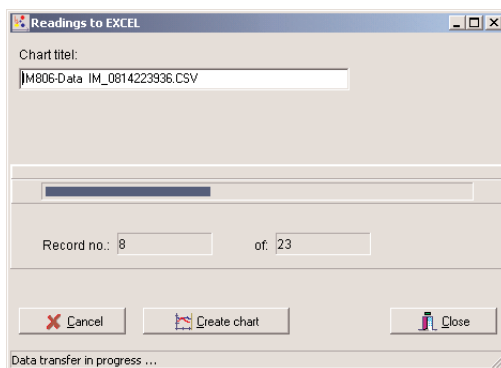


Fig. 19 Data export to EXCEL

The module "IM806 Set-up" must be enabled in the program settings.

The Module has 3 tabs.

In this module, you can:

- do the network settings of the **IM806**,
- change the baud rate,
- set-up the program update,
- change calibration and set values,
- change the service clearances.

Changes in this module are not transferred to the **IM806** automatically.

Changes on these parameters may lead to system reboot of the **IM806**.

You get the parameters for the network settings from your network administrator.

Note:

Changes in this module may affect the function of the **IM806**.

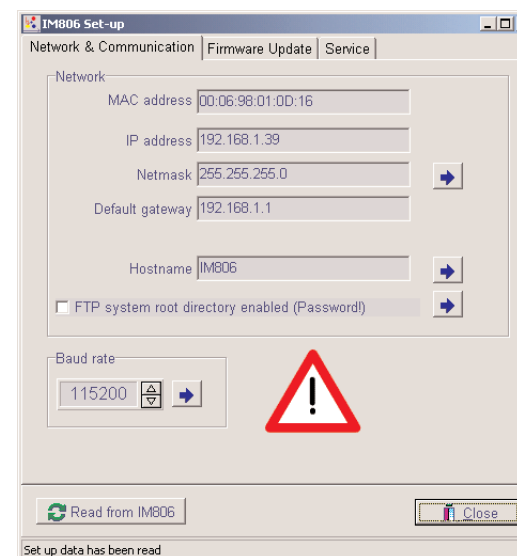


Fig 20 **IM806** Set-up

Hint for the usage of the FTP:

For the access on reading files via FTP no user name and no password is required. The readings are logged in the directory of the FTP.

When you activate the FTP-release, then the main directory of the SD memory card is activated as FTP main directory. In this case, you need a user name and a password.

You find user name and password for full access to the SD memory card on the label on the last page.

11. Firmware update of the IM806

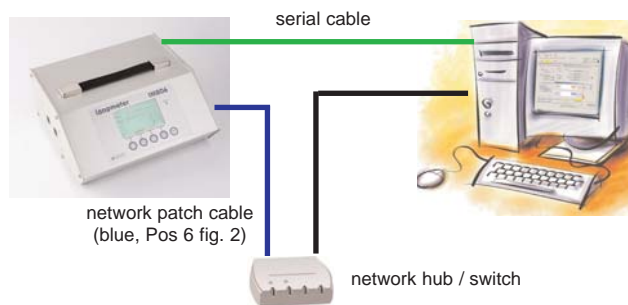
The firmware of the **IM806** will be developed continuously. New versions of the firmware can be downloaded from the web site ionometer.com. The upload to the **IM806** will be done via network and a TFTP-server. The program IM806.EXE includes a TFTP-Server. For using the integrated TFTP-Server the program IM806.EXE has to run.

**11.1 Preparing**

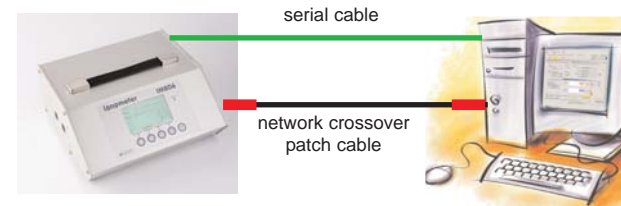
You need for the firmware update procedure:

- the Ionometer **IM806**
- a PC with the installed program IM806.EXE
- the serial cable (Pos. 5 figure 2)
- the blue network patch cable (Pos. 6 figure 2) or the crossover-twisted-pair cable with red plugs (Pos. 7 figure 2)
- the new firmware file IM806.BIN

For the network connect of the IM806 to a hub, switch or router the blue network patch cable (Pos. 6 figure 2) or an other suitable patch cable has to be used.

Fig 21 **IM806** network connect to a hub / switch

For a direct network connect PC <-> **IM806** you should use the crossover-twisted-pair cable with red plugs (Pos. 7 figure 2).

Fig 22 **IM806** network connect to the PC

Start the program IM806.EXE and open the module "IM806 Set-up" (page 34).

Check the correct network data in tab "Network & Communication" (fig. 20).

Please ask your network administrator for the valid data.

Note: The IP-address of the **IM806** has to be stored in the configuration memory of the **IM806**. If a DHCP server in the network is active, the IP-address will be displayed, but it is not stored. Therefore the data has to be stored by a click on then button with a blue arrow.



The **IM806** will reboot.

The network configuration has to be set with valid data for a successfully update of the firmware of the **IM806**.

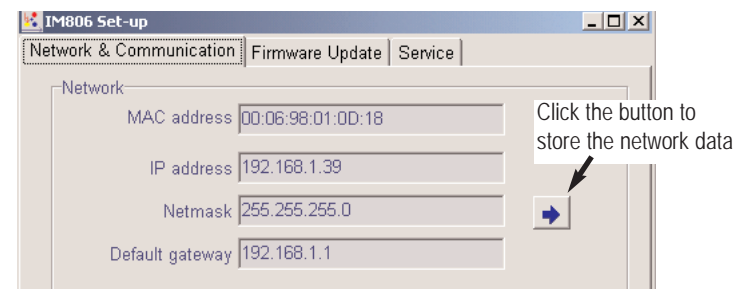


Fig 23 Store the network data

Check the network connection from the PC to the **IM806**:
Start the program CMD.EXE by "Start"->"Run"->"Cmd" or "Start"->
"All programs" -> "Accessories" -> Command
Input the command "ping <IP-address>". Replace the string <IP-
address> with the real IP-Address of the **IM806**.
A sample:

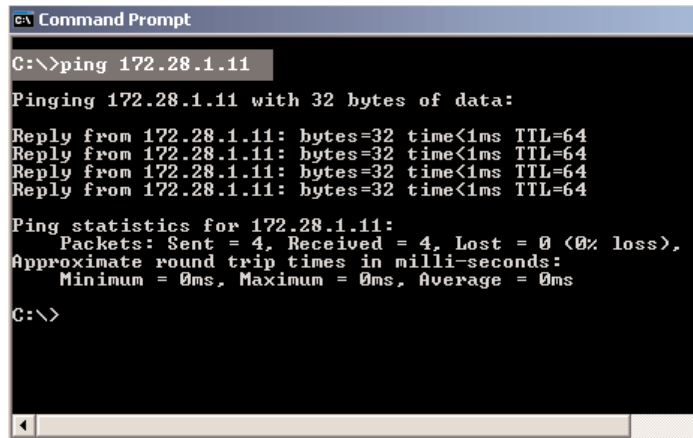


Fig. 25 Network connection check to IM806

The program ping displays then answers of the requests and the required time.

Input the IP-Address of the TFTP-server in the tab "Firmware update". If you use the IM806.EXE integrated TFTP-server than input the IP-address of the pc with the running program IM806.EXE. The tool "ipconfig" shows these IP-address.

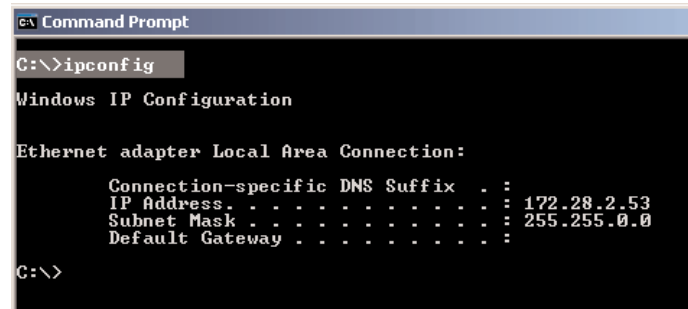


Fig. 26 Sample output of the command "ipconfig"

Input the IP-Address of the TFTP-server in the field "IP address TFTP-Server" and store the data with a click on the button with the blue arrow.

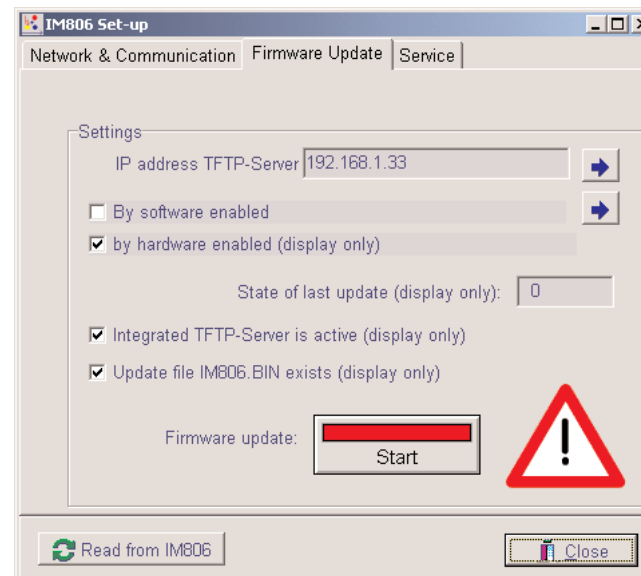


Fig. 27 IM806 Set-up -> Firmware update

Check if the integrated TFTP-Server is activated.
The current state is displayed in the modul "Set-up", tab "Firmware update":

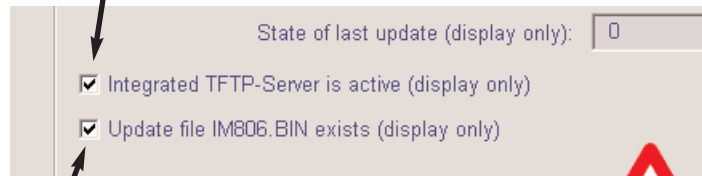


Fig. 28 State of the TFTP-Server and update file IM806.BIN
Check the exist of the update file "IM806.BIN" in the configured path.

Is the integrated TFTP-server not active, than activate it in the program setting form:

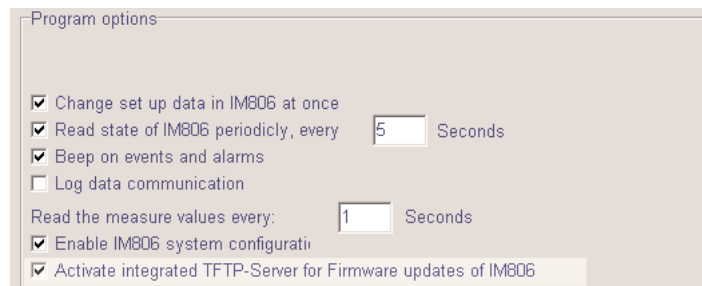


Fig. 29 Program settings: acativating the integrated TFTP-server

If no acces on the update file IM806.BIN than the update file has to be copied in defined directory:

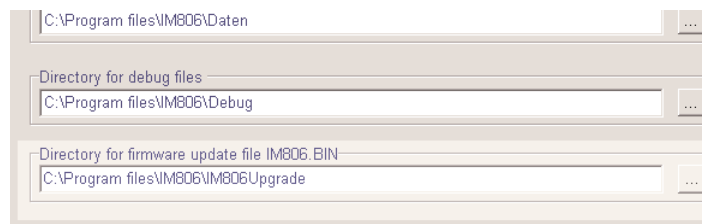


Fig. 30 Configure the directory includes the update file IM806.BIN

The set up procedure above is only necessary before the first update procedure.

11.2 Update procedure

You can start the update procedure by:

- click the "Start" button in the tab "Firmware Update"



or

- activate the software enabling in the **IM806**, switch the **IM806** off and than switch the **IM806** on .

or

- switch the **IM806** off and than press the Menu/Esc key while switch the **IM806** on .

After click on the "Start" button, the IM806 closes the lid and displays "Reboot".

The alarm LED shines and the beeper beeps twice in short time.

About 5 seconds later the Alarm LED flickers. The new firmware is downloading from the TFTP-server. About 6 seconds later the IM806 starts with the new version of the firmware.

The procedure is logged in the system messages of the program IM806.EXE:

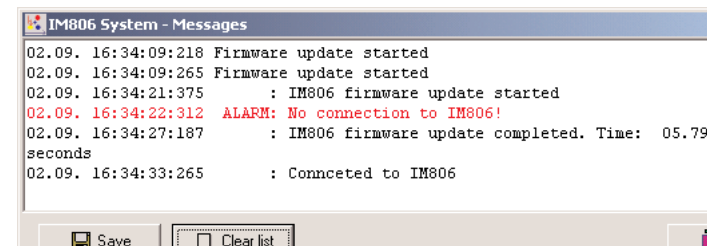


Fig. 31 System messages while the update procedure

12. Safety instructions

Disregarding of safety instructions might cause damages on the device or even injury of persons!

- Only use the **IM806** for its designed purpose!
- Avoid liquids from entering the device, battery charger and power supply!
- The quality of the air must be dry and free of oil and other impurities, that can deposit on dust particles in the air which in turn settle on the walls of the Electrodes.
- Avoid touching the membrane keyboard with sharp or pointed objects!
- Do not use in rooms with danger of explosions!
- Use the battery charger and the power supply only in dry rooms!
- Use the battery charger only for charging NiCd and NiMH battery packs!
- Deposits at the location of the highly insulated attachment of the inner electrode can make it conductive, reducing the sensitivity of the Measuring-System and falsifying the readings.
- Condensation in the Measuring-System can falsify readings. The temperature of the **IM806** should not be considerably lower than the surrounding air during the measuring process.
- Do not insert objects into the Measuring-System electrode) ! Risk of crunching!
- Keep the devices away from children!

13. Technical specifications

Measuring system:	Open measuring system with two parallel mounted electrodes for simultaneously measuring positive and negative polarities of air ions
Measuring of airions:	Airflow, accelerating voltage and the geometry of the electrodes are designed to measure air ions with an ion mobility of 1,3 cm ² /Vs and faster. Slower ions are measured partially.
Polarities:	Positive polarity of air ion Negative polarity of air ion
Ranges of measurement:	Eight ranges of measurement 0 ... 1,000 Ions/cm ³ to 0 ... 40,000,000 Ions/cm ³ , auto range
Zero point calibration:	Automatic zero point calibration when switching on the IM 806 , by pressing a button or in time interval.
Warm up:	min. 30 seconds, typical: 15 minutes
Operating temperature:	0 ... 40 °C
Storage temperature:	-10 ... 50 °C
Displaying measured values:	LCD Display with big numbers
Logger memory:	Files, CSV-formatted (Date, Time, Max-, Min- and average-values of each polarity) stored on integrated SD-memory-Card (256 MB), start, end and reading interval adjustable. Downloading of the files via integrated FTP-Server
Self monitoring:	Battery voltage, fan operating, optical and acoustic malfunction message

13. Technical specifications

Analog line out:	Two galvanically separated analog line out channels (one for each polarity), DC Voltage 0 ... 10 Volt and current 0 .. 20 mA. Voltage output: min. input resistance of the connected device: 10kOhm. Current output: max load resistor of the connected device 400 Ohm.
Internal batteries:	Internal NiMH battery pack, 12 V / 3 Ah, operating time: 6 hours
Mains operation:	Wall power supply 12VDC / 800mA, runs on AC supply from 100 Volt to 240 Volt, 50/60 Hz with mains plug adapters for EU, USA, UK and Australian
Charger:	Plug-in charger 800 mA, runs on AC supply from 100 Volt to 240 Volt, 50/60 Hz with mains plug adapters, charging time about 5 hours.
Connectors:	
Charger / power supply:	2,1mm low voltage plug (positive terminal in the middle)
Serial port:	D 9 way, female connector, Level: RS 232, 4800 to 115200 Baud, NoParity, 8 Databits, 1 Stopbit
Analog line out:	D 9 way, male socket,
Network:	Ethernet 10MB / 8-pol. RJ45-socket
Grounding:	4 mm socket for discharging electric charges and fields
Set-up	Using 5 Keys and the LCD-Display or PC-software included with the IM806 . The PC-program IM806.EXE runs under Microsoft Windows via serial interface; German and English operator guidance.

13. Technical specifications

Buffer battery for real time clock:	Lithium coin button CR2032
Network servers:	FTP-Server Web-Server
Memory for data logging:	integrated SD-memory card
Material of the casing:	Anodised extruded aluminum sheath
Tripod threads:	UNC 1/4 inch (photo) and UNC 3/8 inch (microphone)
Dimensions:	(BxHxD) 246 mm x 108 mm x 226 mm
Weight:	3.470 kg (without accessory)
Warranty:	24 months (12 months on battery and servo drive)
CE-Conformity:	according to EG-guidelines on electro-magnetic compatibility
Item number:	01-050E
Note:	Technical changes reserved

Microsoft und Windows are registered trademarks of Microsoft Corporation.

14. Conditions of Warranty

Umweltanalytik Holbach GmbH gives 24 months' guarantee (servo drive and battery: 12 month) on the Ionometer **IM806** from the date of purchase. Should faults occur in operation, please consult your dealer or supplier.

We reserve the right to repair or exchange the Ionometer **IM806**. The parts used for this are new or as new. Parts taken back shall become the property of Umweltanalytik Holbach GmbH. The guarantee period shall not be extended for the replaced parts or for the Ionometer **IM806** for repair carried out under guarantee.

This guarantee shall not include damage caused by improper use, operating errors, misuse, external influences, flash of lightning/overload, modifications to the product and attachments. Also excluded are parts subject to wear (e.g. batteries, fuses), as well as damage caused by wearing parts (e.g. leaked batteries). The guarantee does not cover damage in transit, consequential damage, costs for down time and infrastructure. The guarantee claim shall lapse if repairs are carried out by unauthorised persons or if the serial number is removed or made illegible. Guarantee can only be granted upon presentation of a clear supporting document of purchase (invoice or sales receipt). In case of repair, please send the device with postage adequately pre-paid and carefully packed (if possible in its original packaging inside a cardboard box) together with a detailed description of the fault to your dealer or to Umweltanalytik Holbach GmbH.

Unfortunately, consignments that have not been prepaid cannot be accepted.

Manual: 1.1 September 2007
Softwareversion: 1.0.2
IM806 Firmwareversion: 1.0.1



Ionometer IM806



Owners Manual



This is Mr. I. Meight He knows the **IM806** and assists you while reading this manual.

Please take your time reading the manual of the **IM806** carefully before putting it into operation.



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**Umweltanalytik
Holbach GmbH**

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