



[www.belmag.rs](http://www.belmag.rs)

2017

## Pulsating Biomagnetic Field Generator



# BelMag PRO

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## User Instruction

Version 1.1

### Medical Disclaimer - Consult Healthcare Professional

You should consult with a healthcare professional before starting any bio-electromagnetic field treatment with BelMagPro device. Statements on BelMag about products and health conditions have not been evaluated by official institutions and are not intended to diagnose, treat, cure, or prevent disease. If you have a health concern of any kind consult with your health care professional. Medical information presented by BelMag in this document is for educational purposes only and is not meant to substitute for the advice of a doctor or other medical professional. BelMag does not make any medical claims or warranties regarding the use of the products. The information presented is general in nature and these treatments may not be for everyone. Like other treatments can have side effects. You should consult you doctor before taking any bio-magnetic field treatment.

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Read all product labels before use.

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Belgrade, Novi Sad, 2017.

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## Installation

**BelMag PRO** is small, mobile and compact extra-low frequency magnetotherapy system for individual use that can be applied anywhere and any time. System consists of USB stick and PC software. USB stick is pulsed magnetic field generator.



Figure - Photos of **BelMag** Device

USB stick is pulsed magnetic field generator.

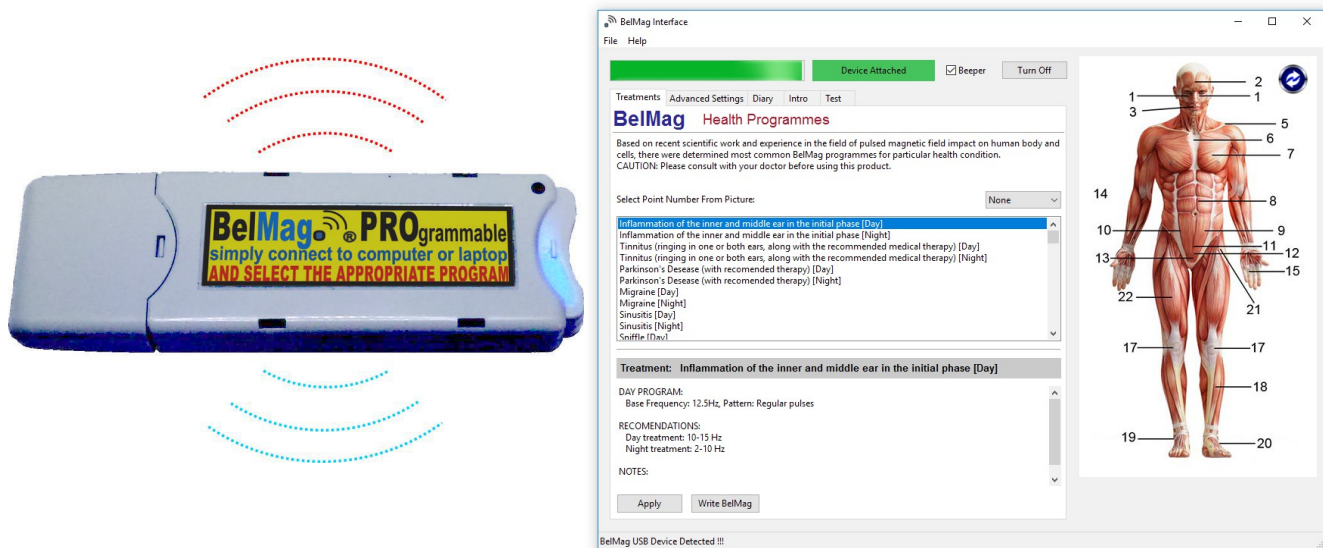


Figure - BelMagPro Stick and Software

Before using of **BelMag PRO** device PC software and specific device driver must be installed on computer where operation of device is intended. Supported operating systems are Windows 7, 8, and 10.

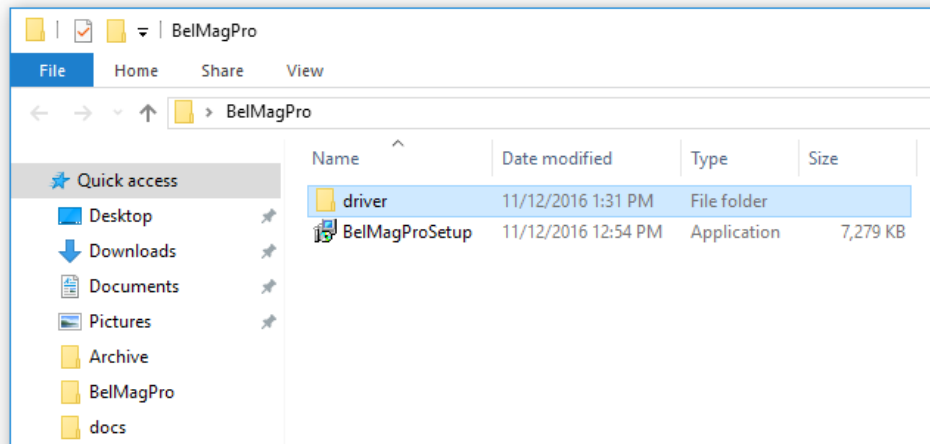
PC software and driver that support this **BelMag PRO** device can be downloaded from [www.belmag.rs](http://www.belmag.rs), or it can be provided with device itself on CD or flash.

### ***Driver Installation Simple Way***

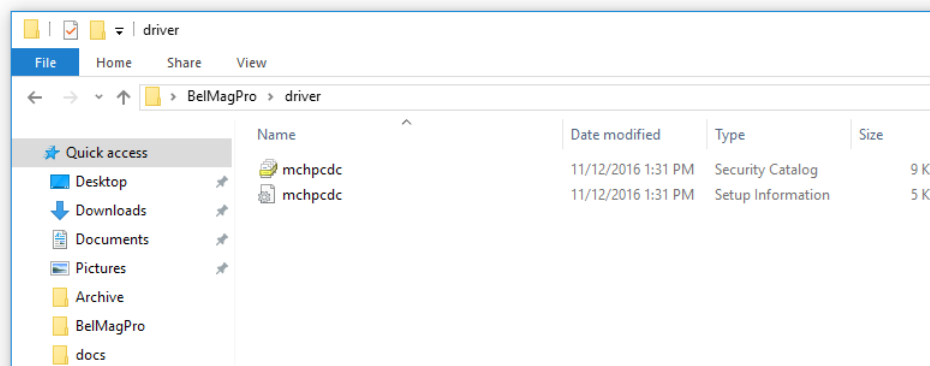
Without successful driver installation **BelMag PRO device would not work**. Depends on used windows operating system (Windows 7, 8, 10), there are various ways that driver can be installed. In this

documentation there are shown two different ways driver can be installed on Windows 10, which can be with minor modifications applied to Windows 7 and 8. This is simplest way which should be used, but if it fails, it should be used installation process from next chapter.

1. Plug **BelMag PRO** device in USB port of the PC.
2. Open folder with **BelMag PRO** installation and driver folder.

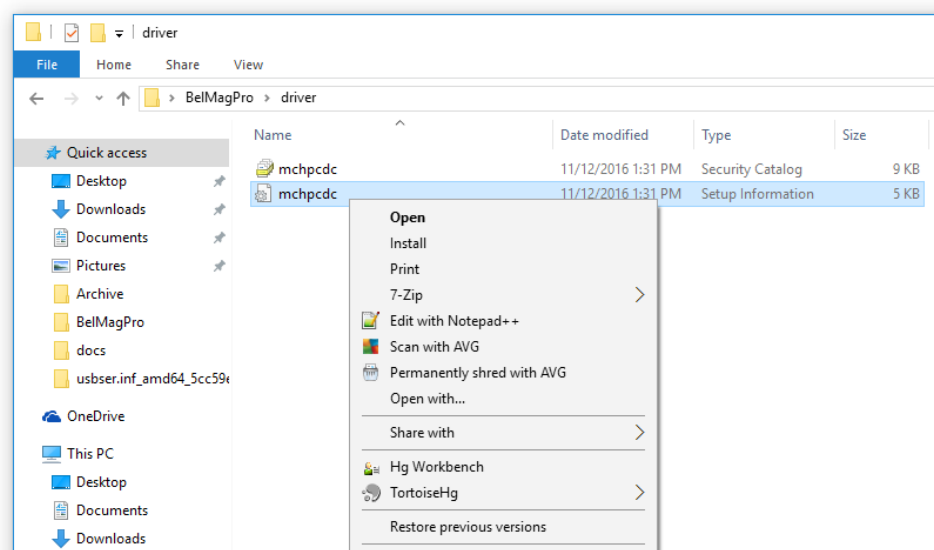


3. Open "driver" folder which contain two files **mchpcdc.cat** and **mchpcdc.inf**.



4. Right mouse click on "**mchpcdc.inf**" and from dropdown list select "**Install**" option.

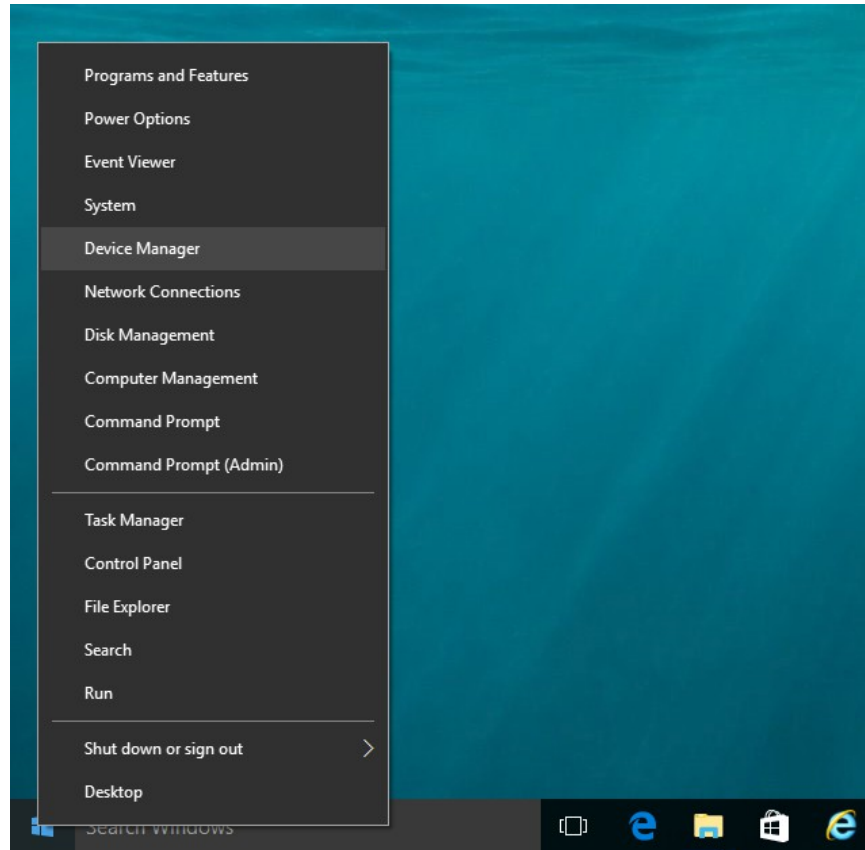




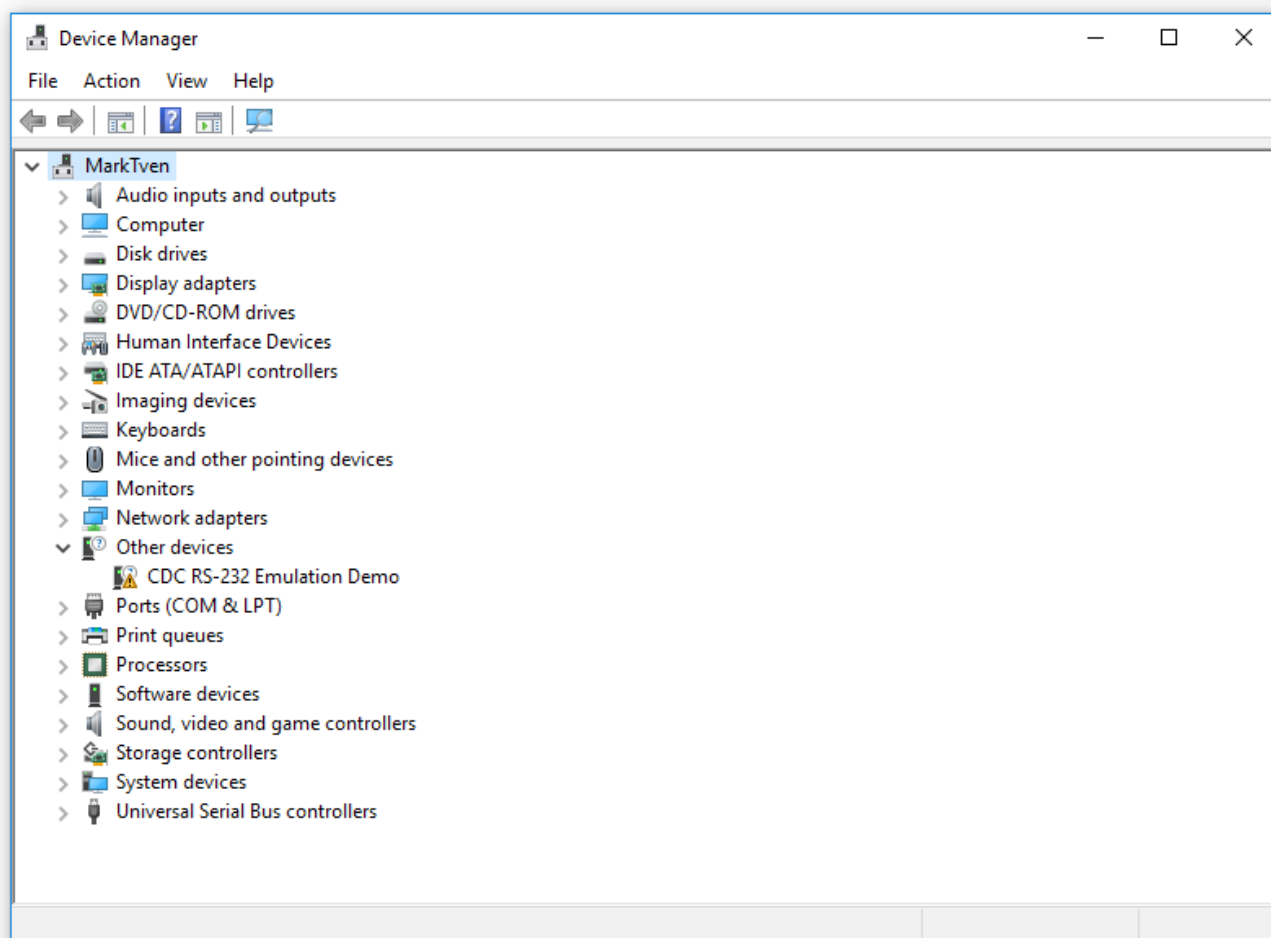
5. Click **"Yes"** button if information window occurs with message: Do you want to allow this app to make changes to your device?
6. Device driver is successfully installed.

## ***Driver Installation Advanced***

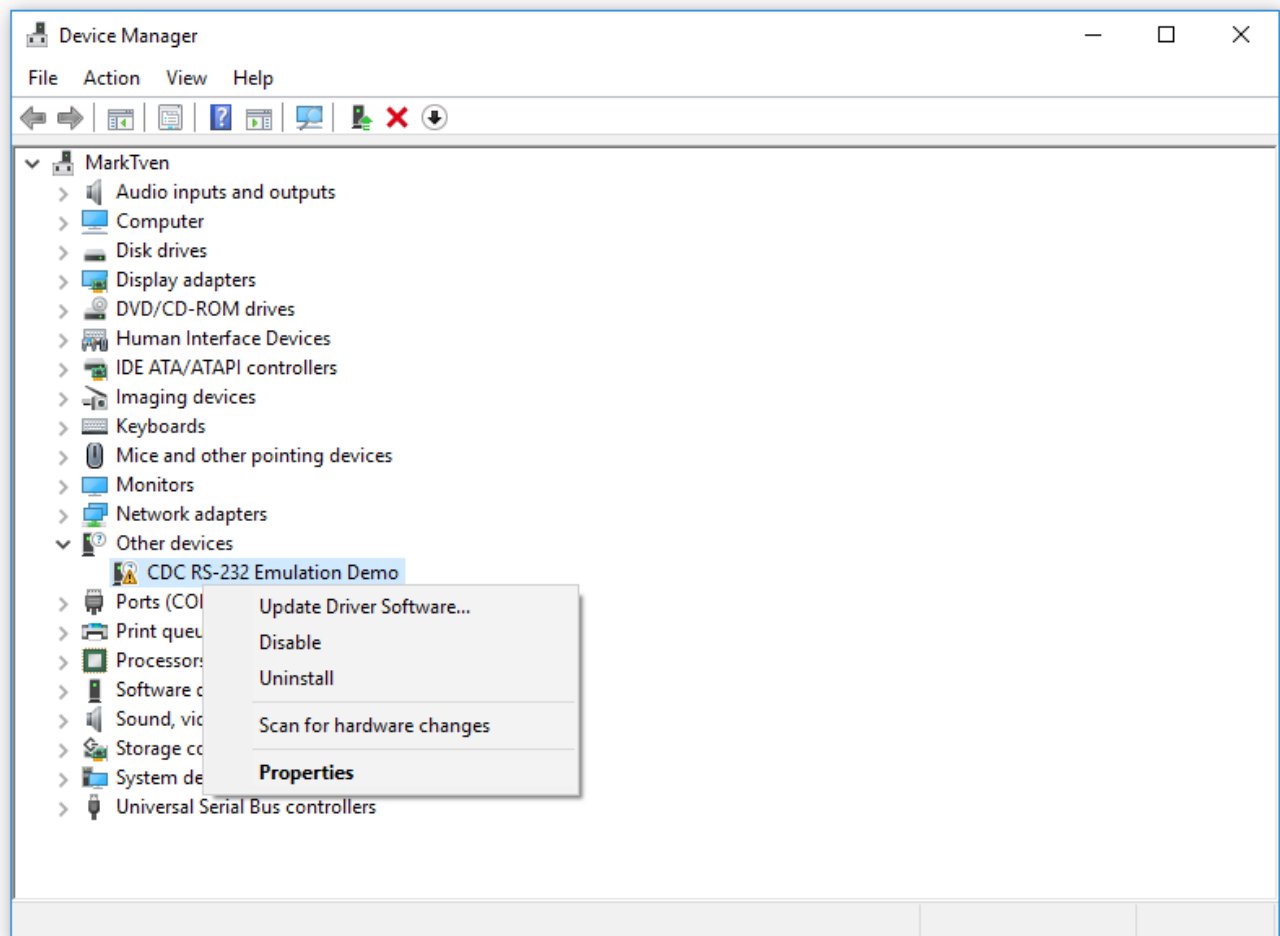
1. Open **"Device Manager"** from start menu. Device manager can be started at different ways, which also depends on Windows operating system which is used (Windows 7, 8, 10). On Windows 10 just right click at **"Start"** button and select **"Device Manager"**.



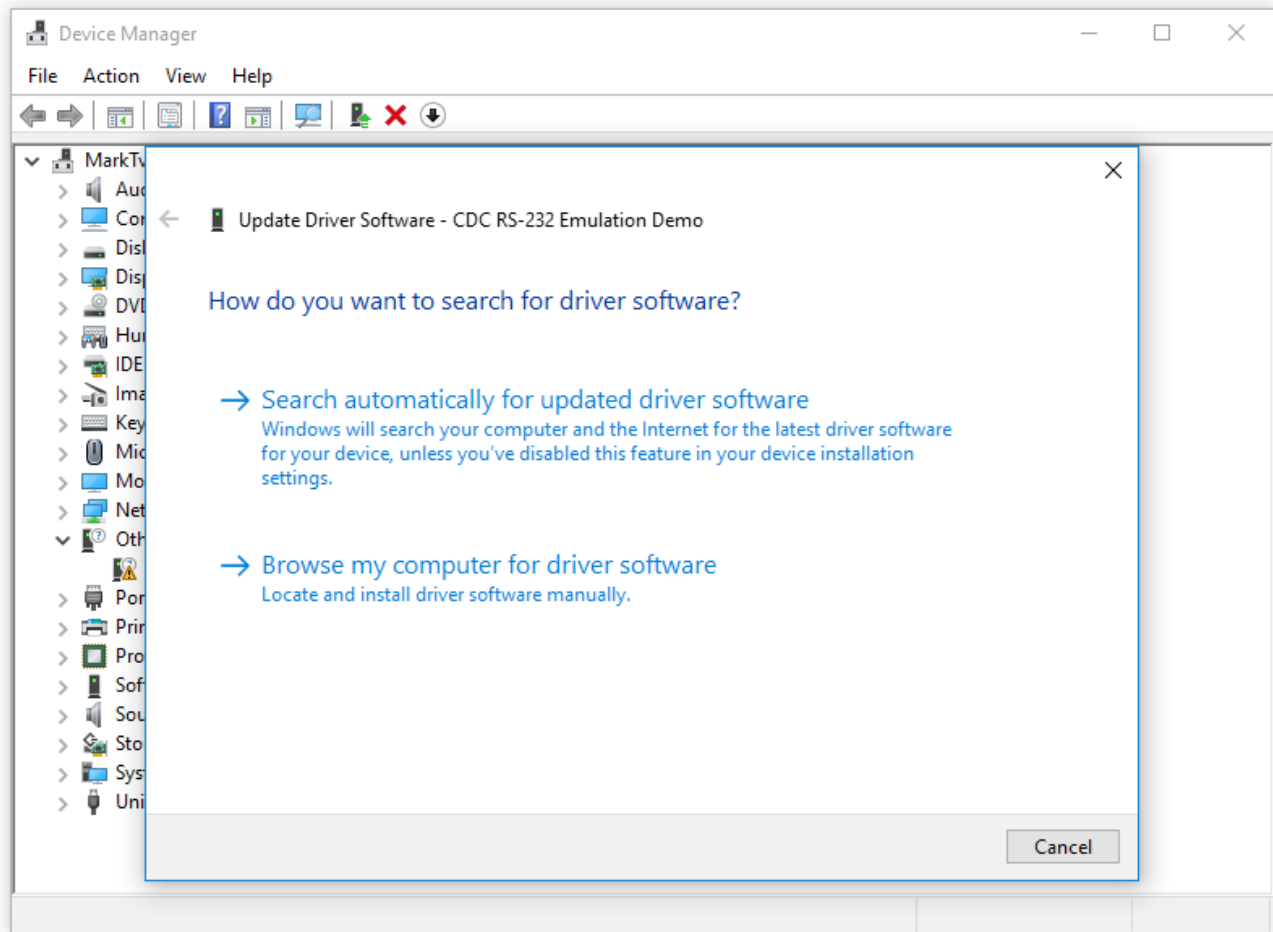
2. Plug **BelMag PRO** device in some USB port of PC. In "**Device Manager**" will appear unrecognized device with yellow triangle, as at picture below. Text of the item can be different depending on operating system used.



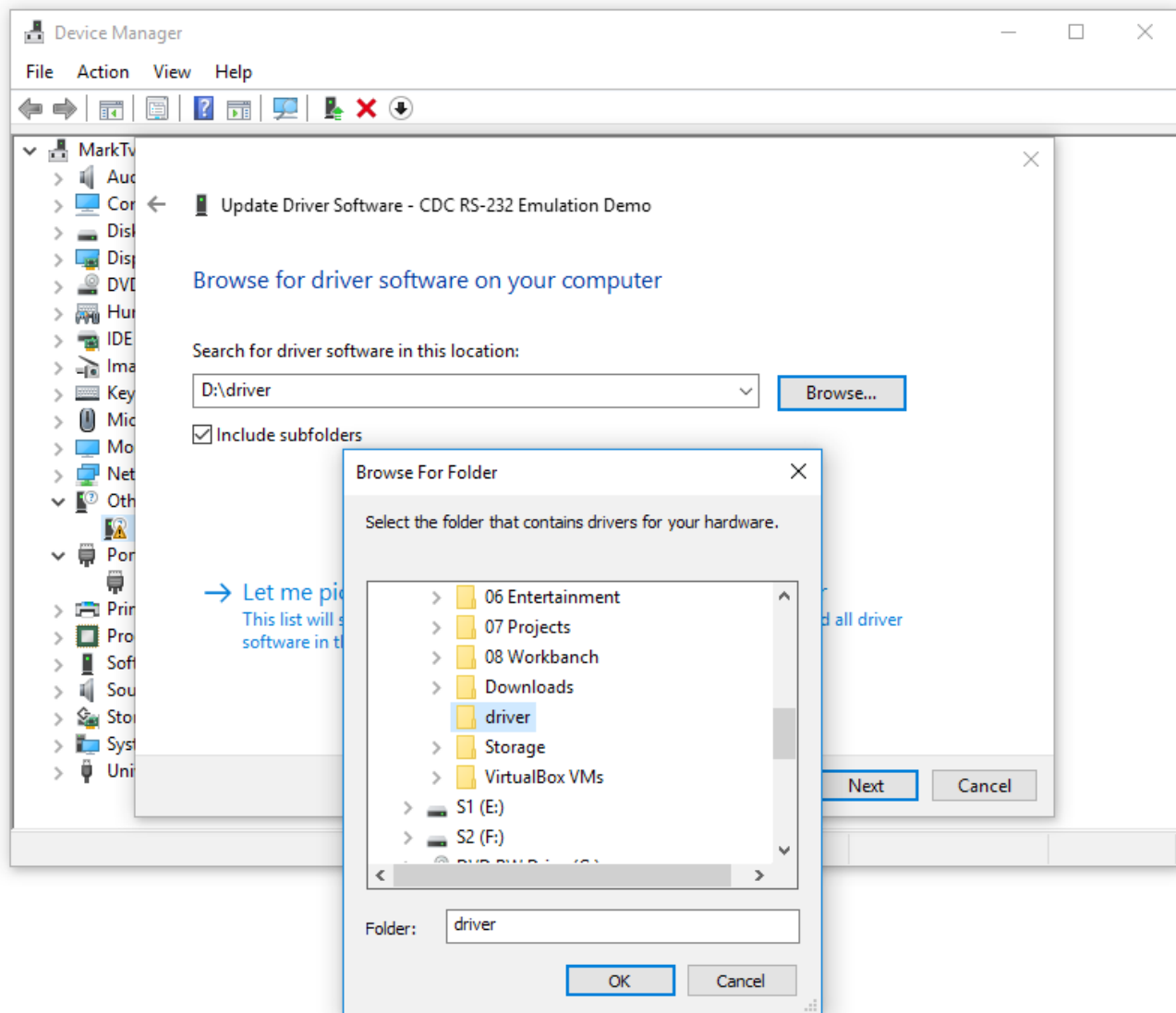
3. Right mouse click at item with yellow triangle and select **"Update Driver Software"**.



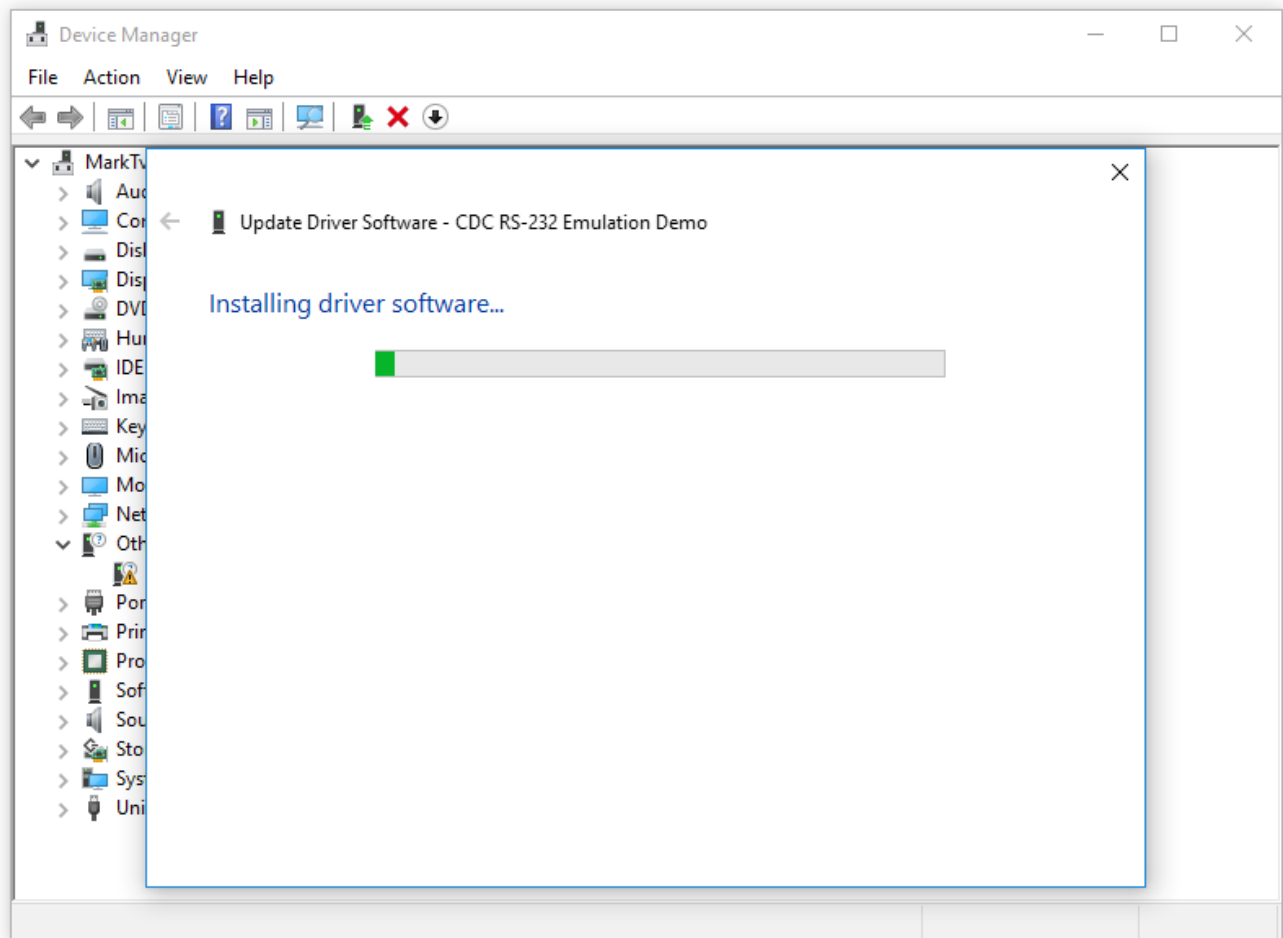
4. From new window select "**Brows my computer for driver software**".



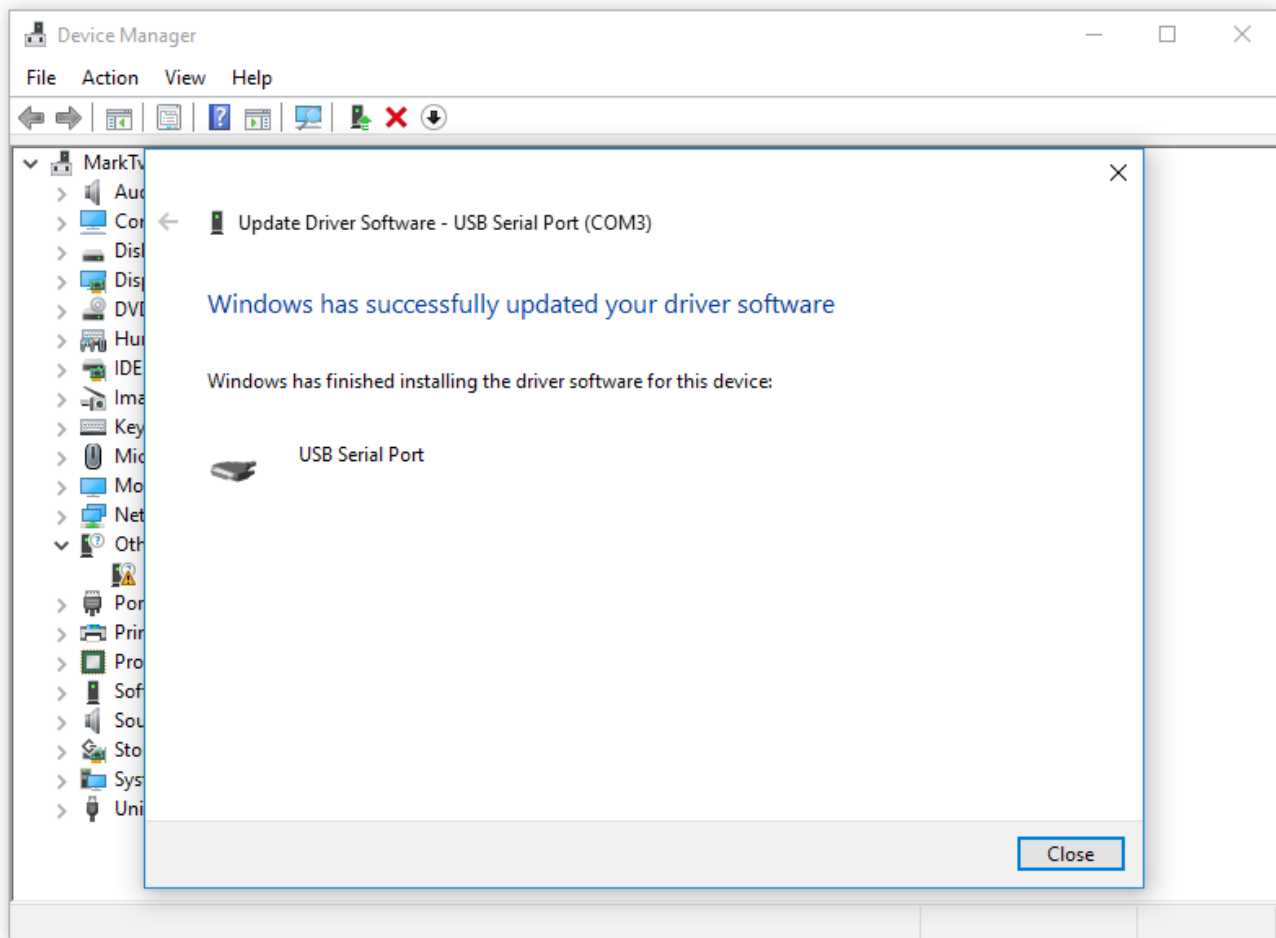
5. New form will appear "Brows for driver software on your computer", where "**Browse my computer for driver software**" button should be selected. After that "Brows for folder" dialog appears. Here should be selected folder where installation driver is located and click "**OK**". After that click "**Next**".



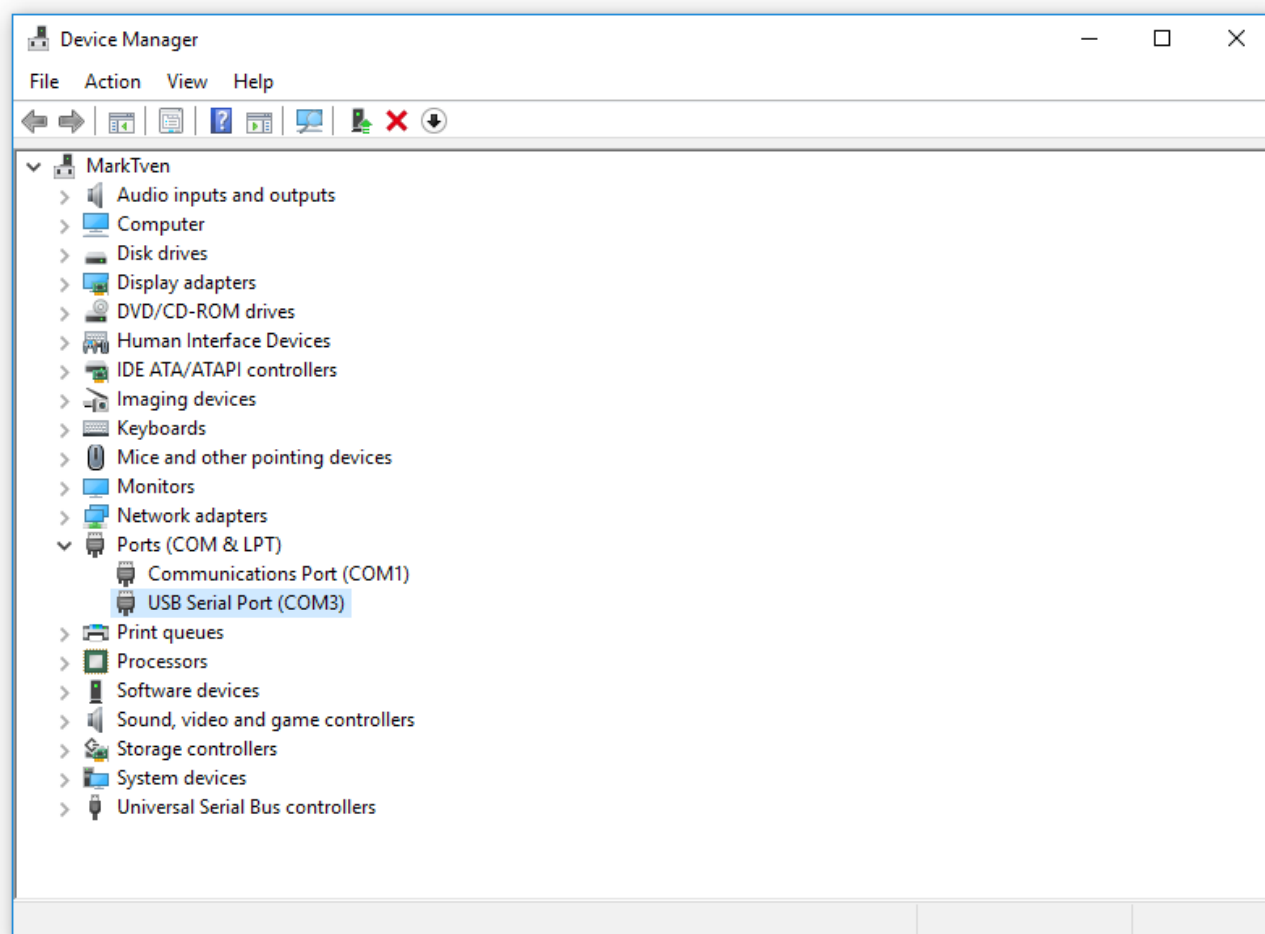
6. After "**Next**" is clicked, installation of driver is started.



7. After few seconds driver installation should be successfully finished.

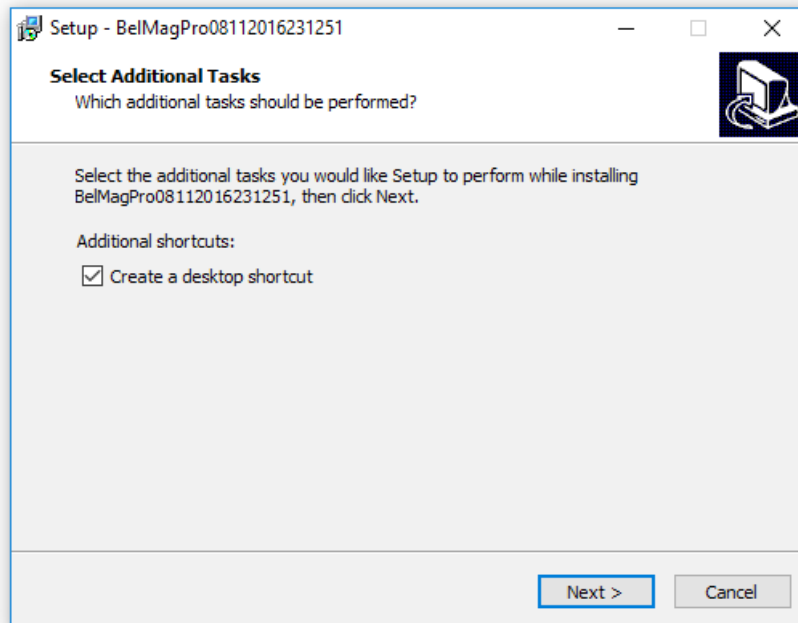




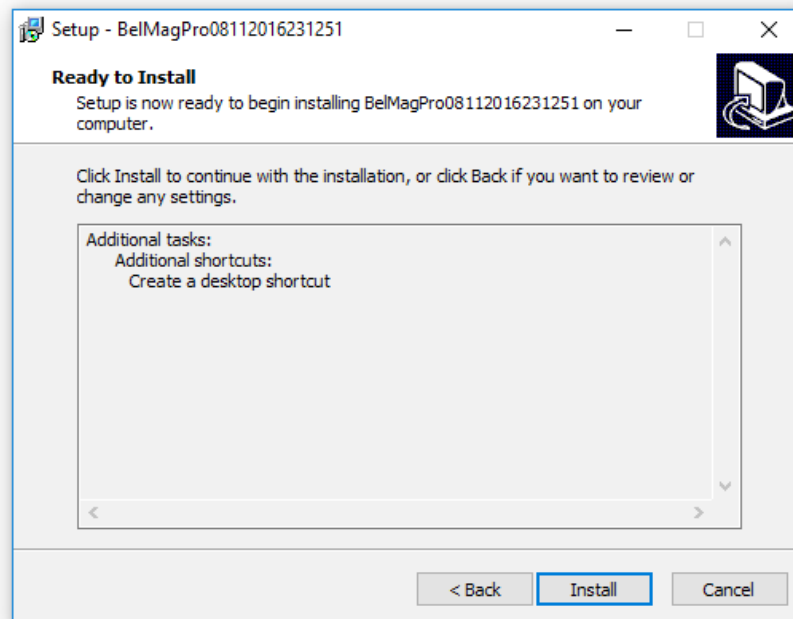


## Software Installation

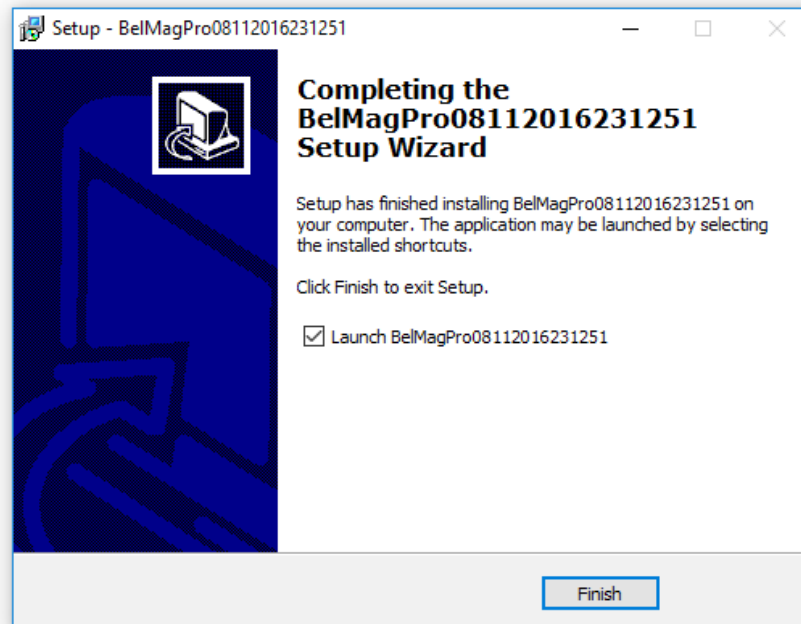
1. Plug **BelMag PRO** device in USB port of the PC.
2. From folder where installations are copied start **BelMag PRO** installer (**BelMagProSetup.exe**).
3. Click "Yes" button if information window occurs with message: **Do you want to allow this app from an unknown publisher to make changes to your device ?**
4. If you want to have desktop icon check "**Create a desktop shortcut**" checkbox and click "**Next**".



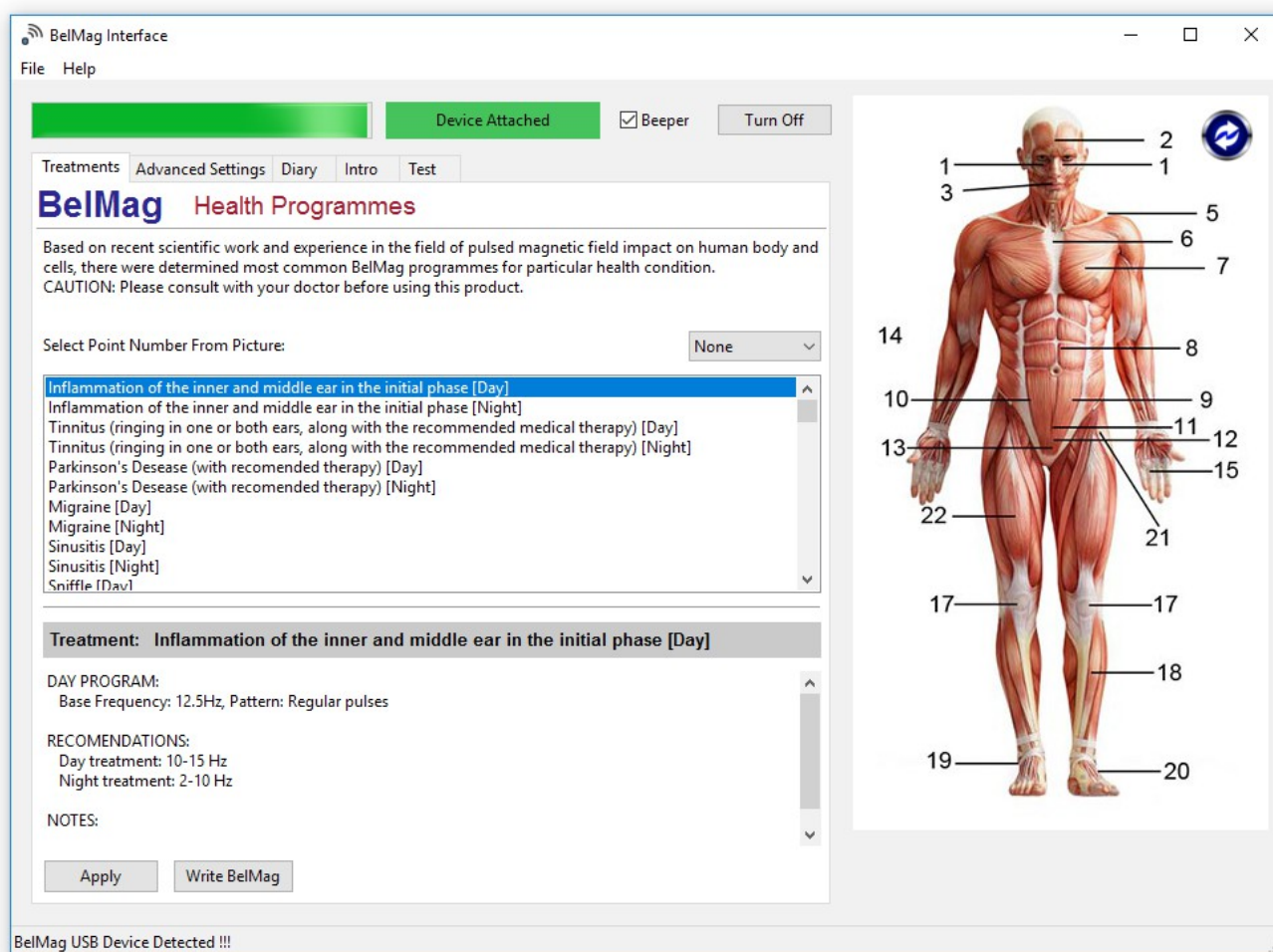
6. Click "**Install**" button on next window.



7. After installation process is successfully finished check "**Lunch BelMagPro ...**" checkbox if you want to software start immediately after installation and click "**Finish**" button.



8. Software is started and connected to **BelMag PRO** device (At down left corner there are message: **BelMag USB device detected !!!**).



Detailed instructions for using of software and device is given in "User Guide" document.

**We wish you successful application of this device.**

## BelMag PRO Technical Description

This flash memory like device is smallest existing device which generate natural biomagnetic field and most advanced device in its category (device for individual use). There are no so small device which is capable to generate such strong biomagnetic field as this device.

Device is developed using most advanced technology supported by **Polymer Li-On** battery which is designed for 800 charging/discharging, which regard to device characteristics provides many years of functioning.

Equipped with light and sound signalization for easier monitoring of functioning with provided parameters.

Cover of USB connector usually can be easy loosed, in this device that is solved that way that cover can be temporary ( when device is connected to available USB port in regime of programming and/or battery recharging ) placed at the bottom of device which can be seen at the pictures.



Figure - Display device in operation and the USB port

## ***Magnetic Field Generator***

Magnetic Field Generator is main and most important part of **BelMag PRO** device. It is responsible for production of bio-magnetic field of desired straighten and pulse pattern which can penetrate body and stimulate body parts and cells.



Figure - Magnetic Field Generation

As it is shown at figure most intensive field is always normal at the USB stick, so that is the way it should be positioned in regard to treated volume.

## ***Sound Indicator***

**BelMag PRO** device is equipped with sound indication feature which can signalize important device events like battery is empty, load treatment, read treatment. Sound indication can be turned on or off from BelMag software.

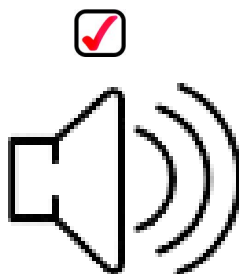


Figure - Integrated Beeper.

Meaning of sound signals:

- Three tone beep with 10sec pause – **Battery is empty.**
- Few one tone beep – Treatment is write or read from **BelMag PRO** device.

## **Led Indicators**

There are two light indicators embedded in device for signalization of different events, like battery status, treatment in progress, red or write treatment.



Figure – **BelMag PRO** light indicators.

### **Red LED**

- On – Battery is chargeing.
- Off – Battery is full.

### **Blue LED**

- Lighting in the rhythm of treatment – Treatment is written in to device and magnetic field generation is active. At lower frequencies it obviously flashing in the rhythm of field, while at higher frequencies it is not so obvious.
- Off – Magnetic field generation is off.

This mean: **Blue LED diode** FULLY REFLECTS DEVICE WORKING WITH FREQUENCY SET OR PULSATING PATTERN SET WITH RECTANGULAR OUTPUT SIGNAL.

## Technical Description BelMagPro Software

**BelMag PRO** software is easy to install, and after installation following icon is shown at the desktop if it is configured so during installation process:



Figure. **BelMag PRO** software icon

### **BelMag PRO Device Status**

When **BelMag PRO** device is connected to USB, BelMag software detects it and give indication about its presence and status. Upper part of the main window contain indicators and controls. When device is connected there are following indicators and controls:

- **Battery level indicator** – represents green gauge that illustrate battery level in percents.
- Device Presence Indicator – Represent colored text field which is **green** and have text "**Device Attached**" when **BelMag PRO** is connected to USB. Field is **red** when device is not attached "**Device Detached**".
- Beeper – represents device status of beeper. Checking or dechecking this box will turn on or off ( **Beeper ON/Off** ) beeper and sound signalization of device.
- **Turn Off** – This button turn off generation of device's magnetic field. Device can be activated again if some treatment is selected and written in **BelMag PRO**.

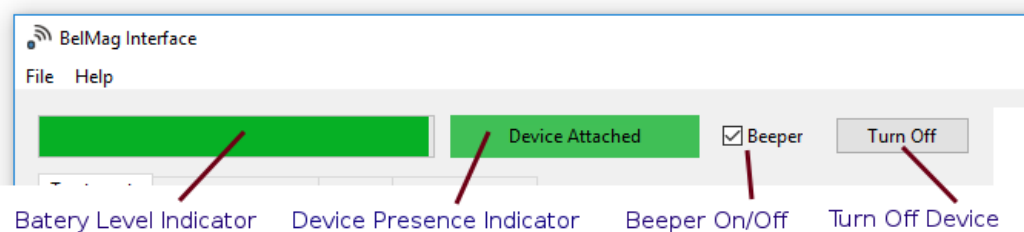


Figure – BelMagPro software status section



## Treatment Selection

Most simple way to start an pulsed magnetic field treatment is by selection some program from "Treatments" tab. To program **BelMag PRO** device one should carefully select some program from treatments list and double click on it. After double clicking on the item at the lower half of the window appears description of the treatment with all relevant information about applied frequency and pattern.

Right part of the **BelMag PRO** software shows illustration of the body parts where treatment can be applied.

After selection of treatment one can click "**Write BelMag**" to configure device and to start desired program. Also, one can click "**Apply**" button to save settings for later application or modification through "**Advanced Settings**".

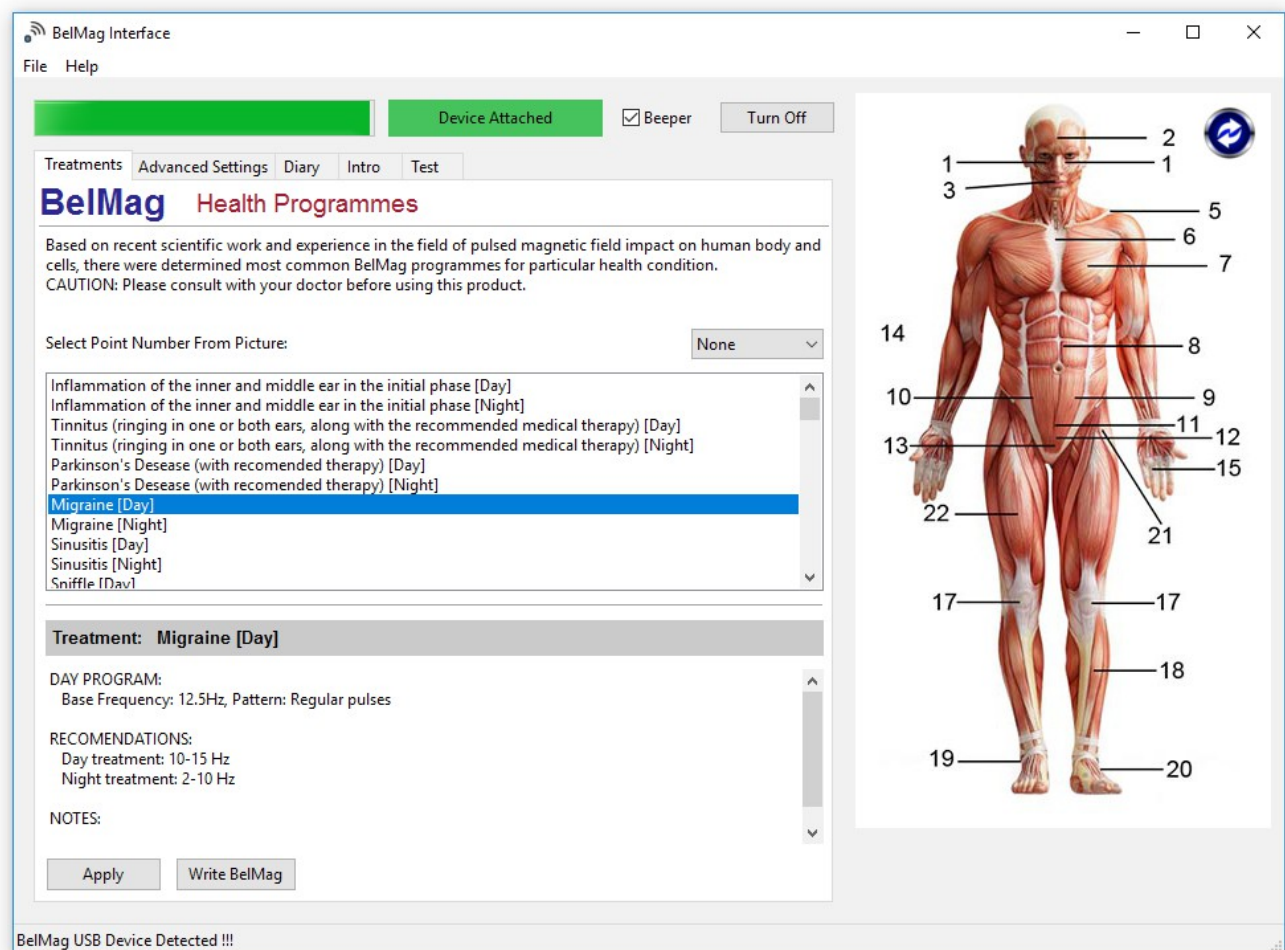


Figure – Treatments section

**BelMag PRO** software has various predefined treatments for various conditions that are given in contemporary literature. Standard user can easily chose between treatments and determine best program for its condition.

**NOTE:** DO NOT USE THIS DEVICE WITHOUT PRIOR CONSULTATION WITH DOCTOR. DEVICE MAY NOT BE SUITABLE FOR ALL PATIENTS AND MAY PRODUCE SIDE EFFECTS IF NOT USED PROPERLY.



Figure – **BelMag PRO** stick device in autonomous mode

## ***Advanced Settings***

Advanced settings section is designed mainly for professionals who has experience with pulsed magnetic field treatments and exactly know how to create customized treatments specially designed for individual

purpose or therapy. Maximum for slot frequency is 300Hz and an error will show when one wants to write to BelMag device if it is exceeded.

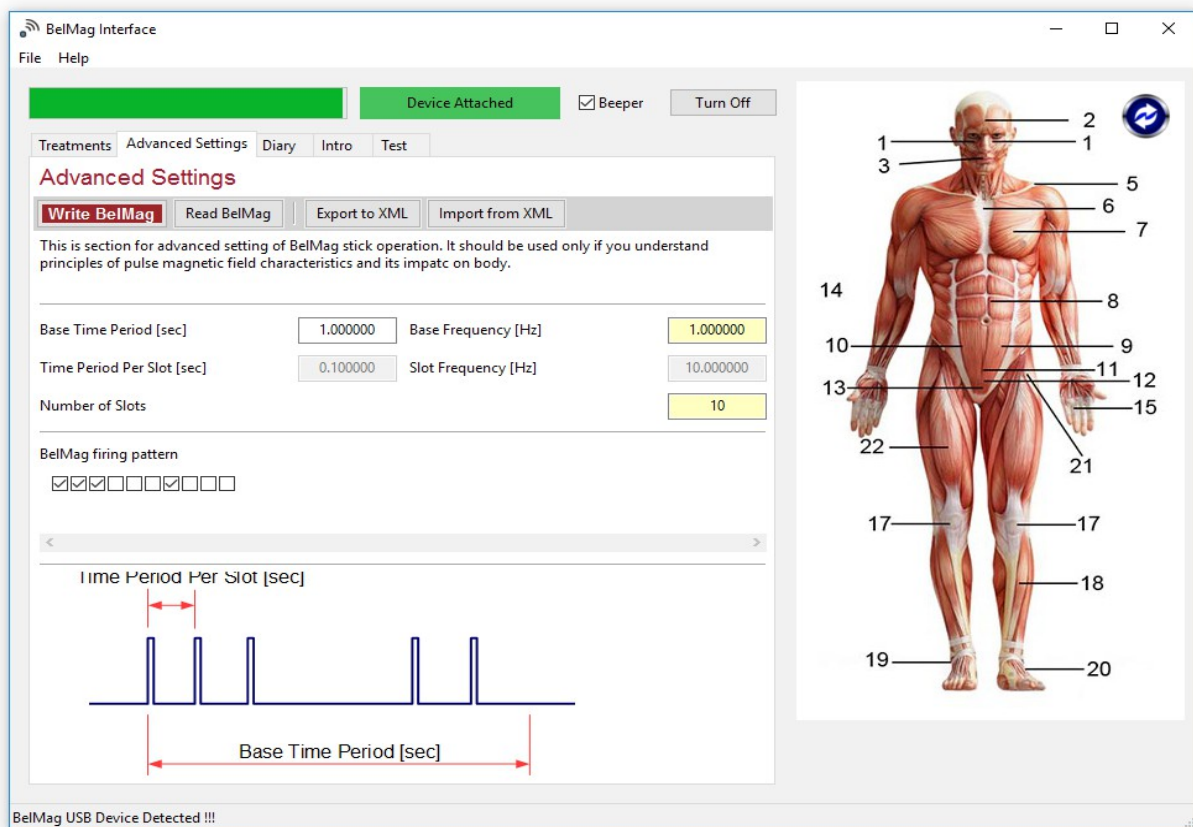


Figure – BelMagPro Advanced Settings

**Main parameters that should be set are:**

- **Base Frequency [Hz],**
- **Base Time Period [sec],**
- **Number of Slots, and**
- **Checkboxes in "BelMag firing pattern" section.**

**Parameters that cannot be set and that are calculated from main parameters are:**

- **Slot Frequency [Hz],**
- **Time Period Per Slot [sec]**

$$\text{Number of Slots} = \text{Number of Checkboxes}$$

**BelMag PRO** magnetic field generator produce periodical narrow magnetic field pulses with pattern that can be customized and designed to specific needs.

**"Base Frequency" [Hz]** – represents frequency of periodical patterns that consists of "Number of Slots" time slots.

**"Base Time Period" [sec]** – is time period of periodical patterns and it is in following relation to "Base Frequency":

$$\text{Base Time Period} = 1 / \text{Base Frequency} [\text{sec}]$$

When "Base Frequency" is set, then "Base Time Period" is automatically calculated and filed, and vice versa.

**"Slot Frequency"** – This is frequency of single slot, it cannot be set and it is calculated from **"Base Frequency"** and **"Number of Slots"**:

$$\text{Slot Frequency} = \text{Base Frequency} * \text{Number of Slots} [\text{Hz}]$$

**"Time Period Per Slot"** – Is time duration of single slot and it calculate from **"Base Time Period"** and **"Number of Slots"** :

$$\text{Time Period Per Slot} = \text{Base Time Period} / \text{Number of Slots} [\text{sec}]$$

**"Number of Slots"** – This sets number of slots within periodical signal where can be set firing or not firing of pulses which non-periodic part of signal.

**"BelMag firing pattern"** – This section contain number of check boxes defined in "Number of Slots" field. When checkbox is checked than in that time period generation of magnetic field is triggered. Firing pattern defines some arbitrary magnetic field generation pattern which periodically repeat during device operation.

## **EXAMPLE: Setting of the Schuman with Nogier's frequency**

Schumann frequency treatment is specially designed firing pattern that basically represents modulation of base (**Slot Frequency**) **7.8 Hz** frequency square signal with some square signal with frequency of **1.2 Hz** ( In this case, this frequency-Nogier ) (Nogier Frequencies) That means that device generate 7.8 Hz pulses in one period of 1.2 Hz, the other period is silent.

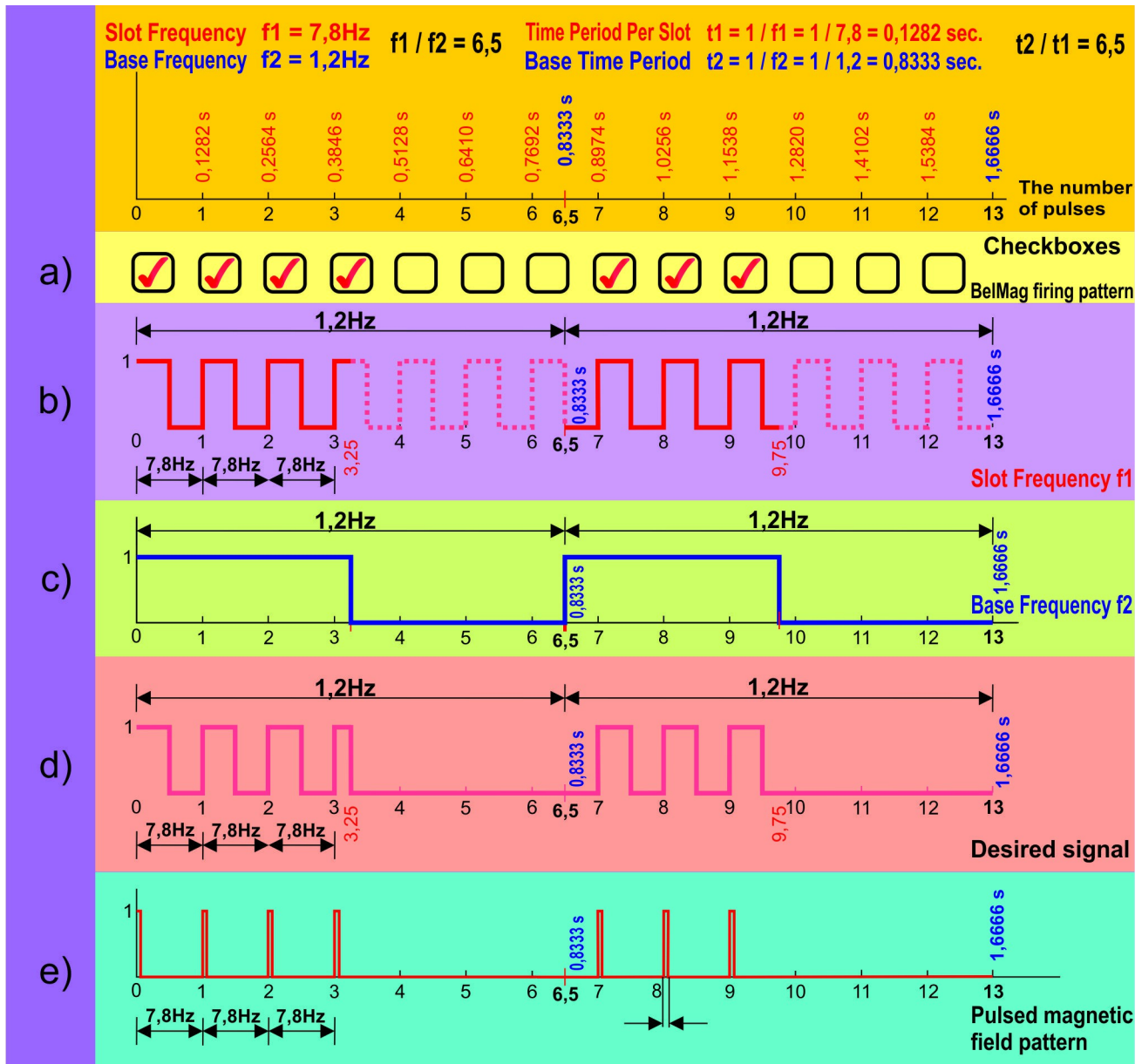


Figure – Specific Schumann frequency pattern and settings.

Figure represents how two frequencies are combined to obtain desired firing pattern. **Diagrams b) and c)** represents square signals with desired frequencies of **7.8Hz** and **1.2Hz**. **Diagram d)** represent desired signal that is modulation of previous two signals. Graphically it is obvious how modulation diagram is obtained. **BelMag PRO** device does not produce squared magnetic field, but rather pulsed magnetic field with narrow pulses. Whenever signal goes from 0 to 1, **BelMag PRO** generates short magnetic pulse. Pulsed magnetic field pattern is shown at **diagram e)**.



One checkbox from BelMagPro software represents one period of modulated frequency of 7.8Hz, as can be seen from **diagram a)**.

**Checkboxes = Number of Slots**

**1 checkbox = 1 slot**



Figure. Meaning of checked slot of **BelMag PRO** firing pattern.

One period of 1.2Hz frequency **does not hold whole number of pulses** at frequency of **7.8Hz** (it contains 6.5 pulses of 7.8Hz)

**Number of Pulses = Slot Frequency / Base Frequency**

$$6.5 = 7.8 / 1.2$$

so resulting pattern is not periodic at one period of 1.2Hz. If we consider two periods of 1.2Hz signal, then within that interval we have whole number of pulses of 7.8Hz, which means that resulting modulated signal is periodic at two periods of 1.2Hz frequency, which can be seen from diagrams b), c), and d). **Number of pulses (must be whole number)** we need must cover two periods of 1.2Hz and one 1.2Hz period contain **6.5** periods of 7.8Hz frequency ( $7.8/1.2 = 6.5$ ). So number of pulses (**Number of Slots**), which is equivalent to number of periods are:

**Number of Slots = Number of Impulses \* Number of Base Frequency Periods**

$$13 = 6.5 * 2$$

**Number of Slots = Number of Checkboxes**

**Frequency of periodic pattern** is half of **Base Frequency** of **1.2 Hz** frequency and that is **0.6 Hz**.

So, when we want to set Schumann frequency pattern to **BelMag PRO**, we must set **following parameters**:

**"Base Frequency"** parameter to **0.6Hz**,

**"Number of Slots"** parameter to **13**, and

**Slots** shell be configured **as shown at the diagram a)** from the figure.

## ***Diary***

Diary is software component that allow user to monitor progress and impact of applied treatment during time. It is useful for users to determine does some program works for them or not, or for doctors and professionals to monitor progress of the treatment and establish best individual treatment therapy in each situation.

Diary section contains two tabs:

- History
- Entry

History tab contain list of diary entries with most important data for each entry – Date, Time, and Summary. When one want to see details of each diary entry it should be double-clicked by left mouse button, which opens selected entry.

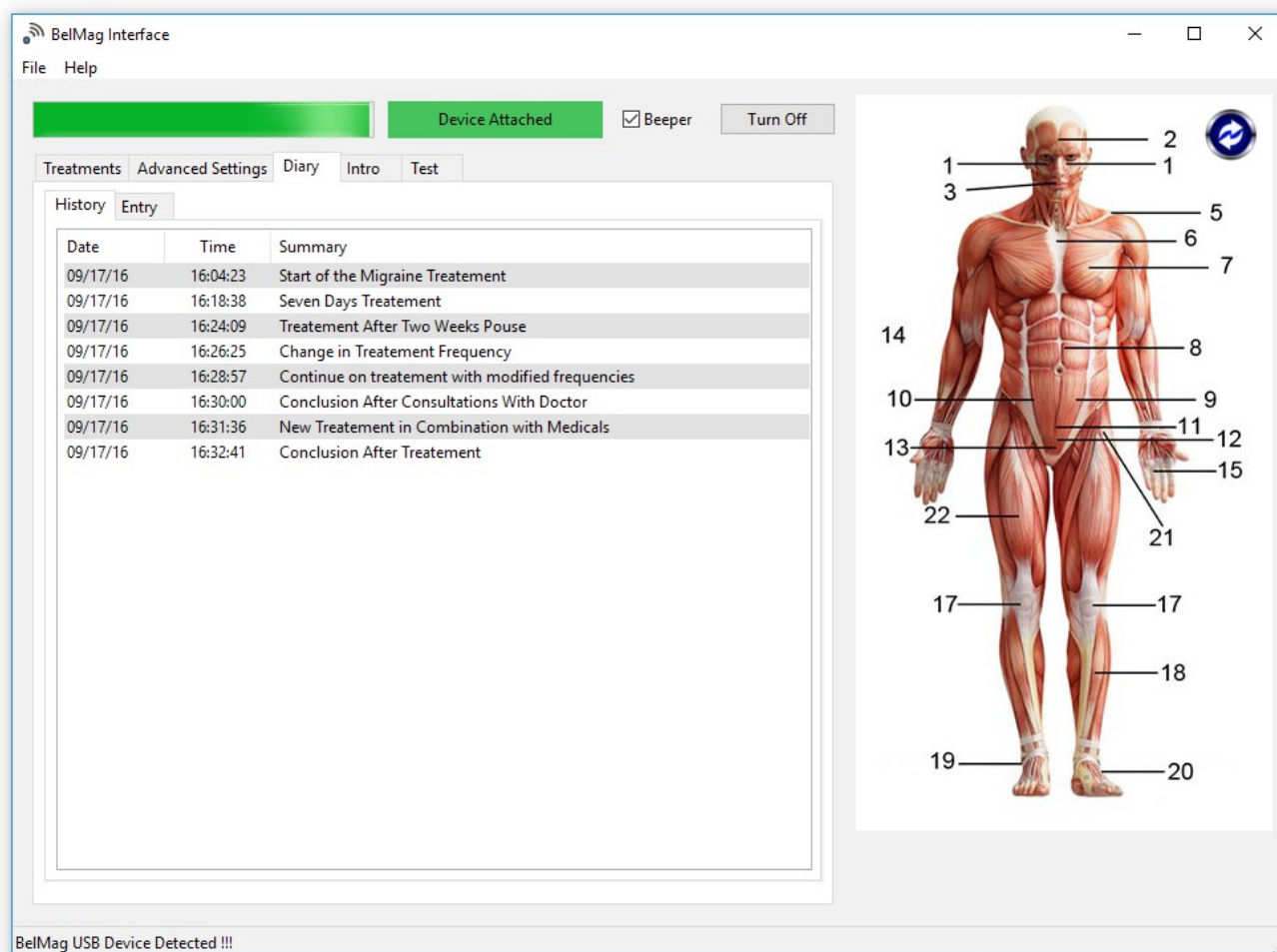


Figure – BelMagPro software history Diary section

Entry tab is for preview of existing diary entries as well as for creation of new entries. Main part of entry tab are toolbox with main operations (New, Save, Close), header and diary entry body.

Toolbar consists of following buttons:

**"New"** – When one click at "New" button new empty form is created with current date and time.

**"Save"** – When one finish population of diary entry, it should be saved and archived by clicking at "Save" button.

**"Close"** – When work or preview of diary entry is finished one can click "Close" button, when "Entry" window is closed and "History" window is opened, where one can see new entry and old entries.



Entry header consists of following items:

**"Date"** – Which represents entry creation date.

**"Time"** – Represents entry creation time.

**"Summary"** – It is short description of entry.

Diary entry body is edit box where one can details and specifics of treatment at that day. This can indicate the progress of therapy and is most important part for those who monitor treatment progress, whether it is individual user who want to know how treatment really works or doctor or other expert which want to determine specific global or individual correlations in order to design most effective treatment for individual use or for specific conditions.

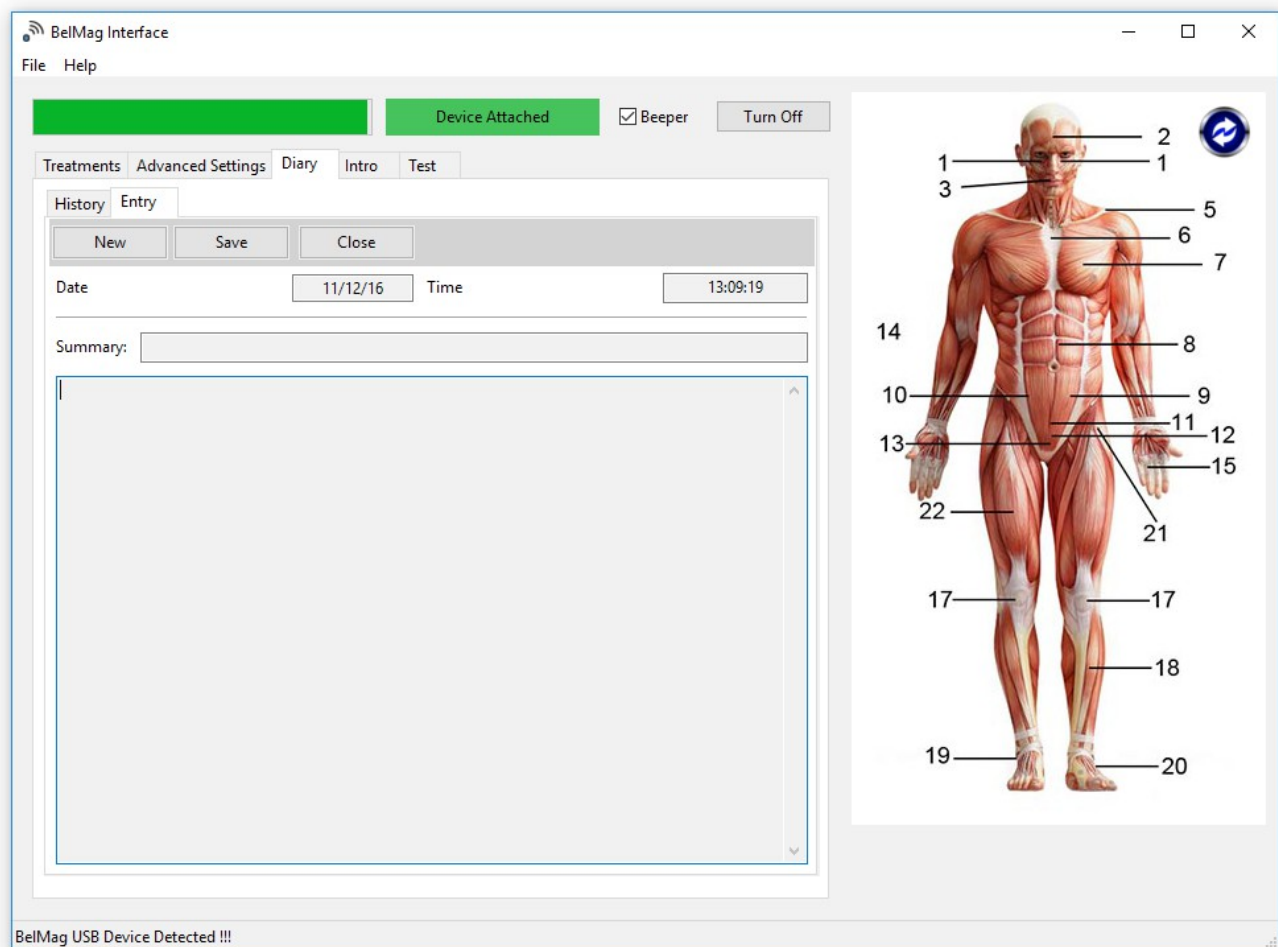


Figure – BelMagPro software entry Diary section.

## Help

**BelMag PRO** software has help module where one can get useful and important information about device functioning.

Help section can be reached from "Help" submenu from main menu. One should select "Help" option from main menu and then "BelMag Help" option, which opens new help window.

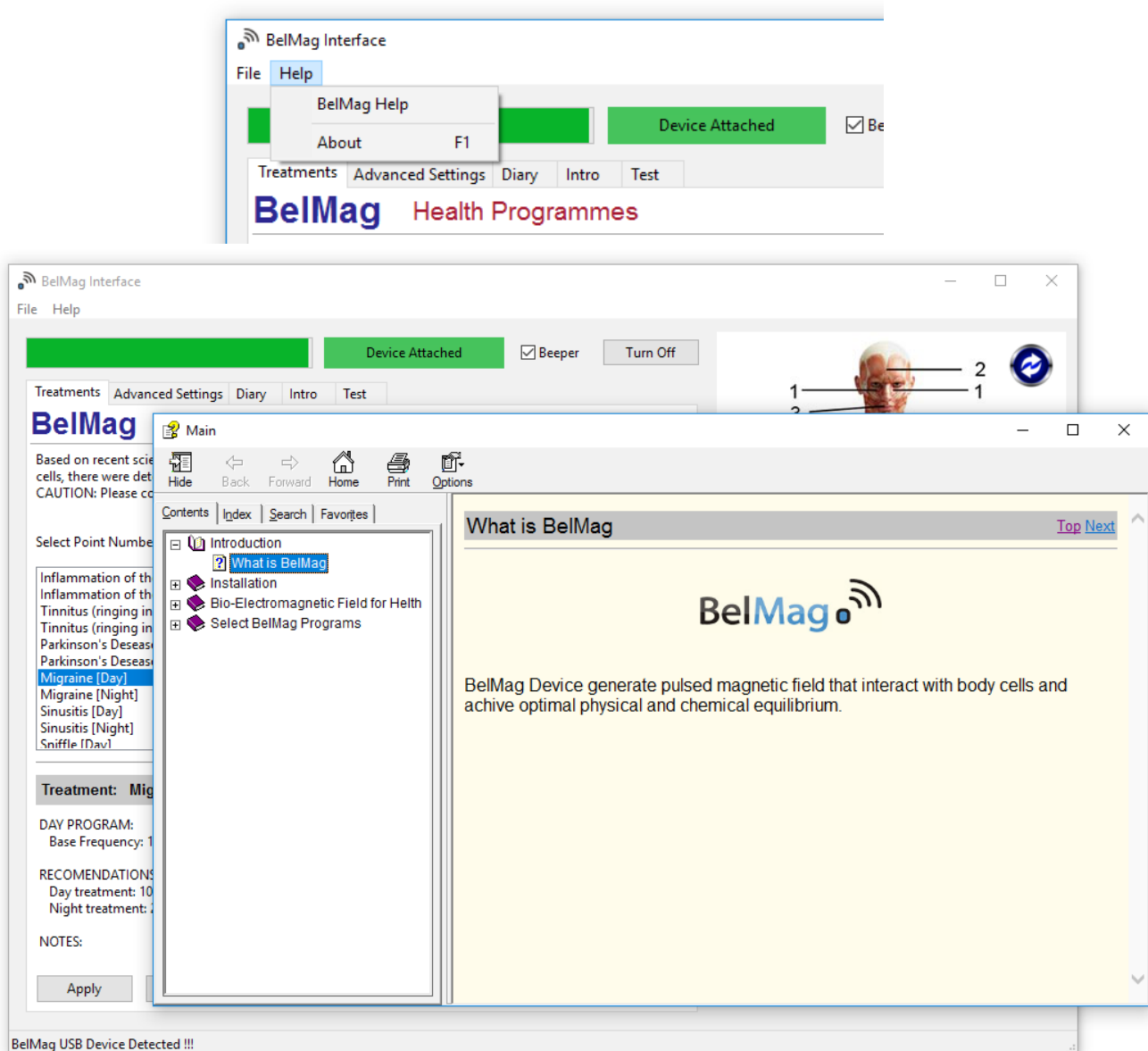


Figure – BelMagPro software help section.

Help window consists of toolbar, tabs at left side, and right side window with data and information.

Most important part of the help is content tab, which consist of help content which allows easy navigation through the data.

## Applications

Belmag PRO can be used in the prescribed treatments of a few tens of minutes to all-day use, with extremely positive effects on human health. Because of their extremely small size is easy to-day use because it is easy to use in work, leisure and other activities.

The exploitation does not require any maintenance. Device Access is via any USB port of your PC or laptop in order to adjust the required or desired frequency.

The device can be set to operate in the range of **0,1 do 300,0 Hz ("Advanced Settings" )**.

Depends on desired treatment BelMagPro stick should be positioned as close as possible to treated part of the body. It should be fixed to body using Velcro fastening belt. Following illustrations show where device should be positioned and how Velcro fastening belt can be used.

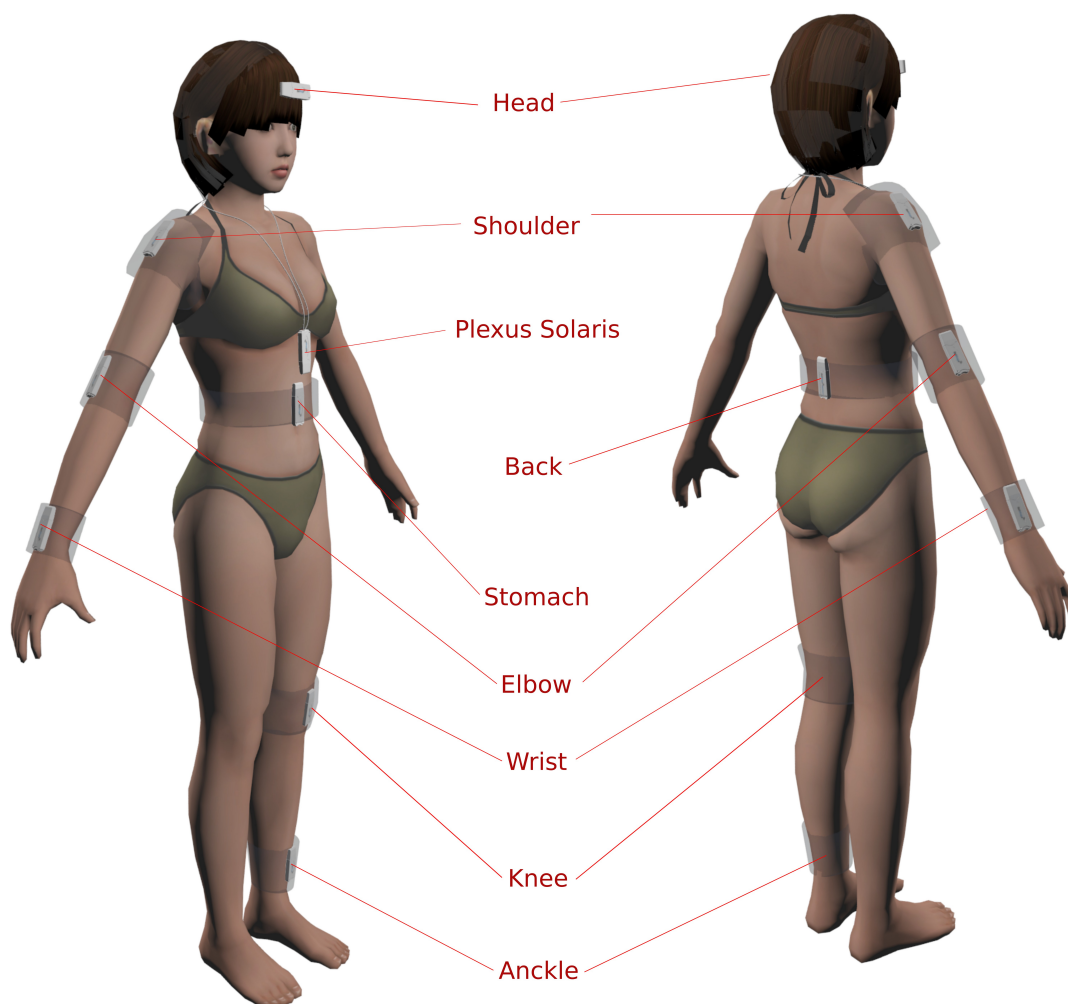


Figure – Places where BelMagPro device should be positioned.



Figure – Examples of using Velcro fastening belt for positioning of BelMagPro device

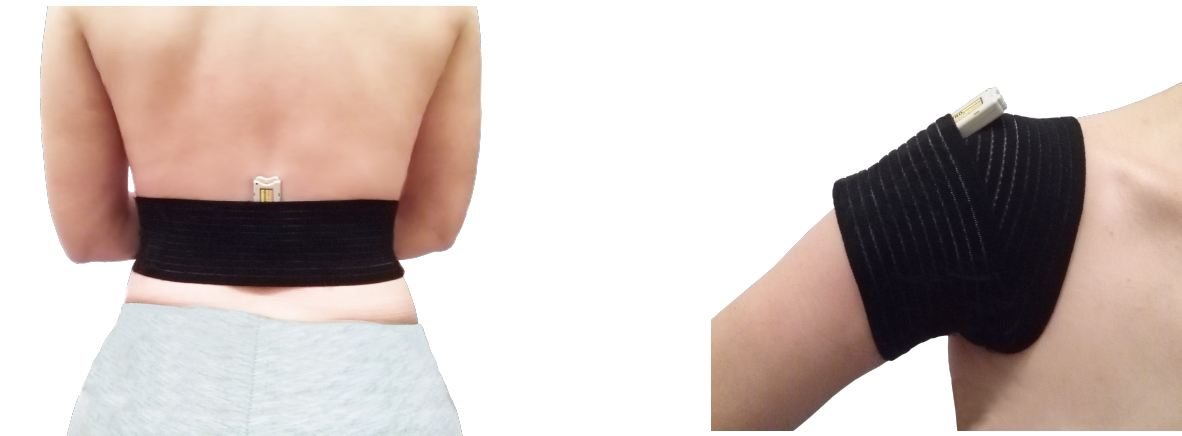


Figure – Examples of using Velcro fastening belt for positioning of BelMagPro device.

## Outstanding Benefits of This Device

- Complies with EU Standards
- Proven high quality
- Proven positive effect on human health
- The device is smallest at the market
- Very easy for individual use
- Simple, well equipped and easy to adjust
- Easily understandable and comprehensible instructions for handling
- Extremely reliable and durable in operation
- It covers the entire ELF (Extreme Low Frequencies) frequency range
- The frequency selection ensures a virtually limitless number of different programs
- Variable effort to a broader spectrum of activity, which is not possible with permanent magnets
- Polymer Li-On rechargeable battery allows 24 hours of continuous operation with highest frequency of 24Hz.
- Extra-low power consumption with maximum effect
- Does not produce any noise
- It does not require any additional equipment
- The choice of frequency is chosen individually
- It does not require the assistance of others in setting

- It does not require the help of other persons with any treatment
- It can be worn continuously for 24 hours without any harmful effects at frequencies up to 24 Hz
- It is convenient to carry and use for the time of work or rest
- Ideal for a sports injuries
- The field strength is more suitable for the human body, in contrast to the permanent magnets
- Pulsed field may be applied for the treatment of neurological disorders, in contrast to permanent magnets
  - **lower frequencies** are suitable for relaxation and sedation
  - **higher frequencies** are suitable for the stimulation
- Pulsed field on the neurological plan significantly increases the perception and increases mental abilities
- Eliminate any indisposition
- The device is placed as close to the site of pain, but not farther than 50 cm
- When the elimination of pain simple rule applies: the stronger the pain - to higher frequencies
- Protects from harmful radiation of technical environment
- While you sleep, relax, work, **BelMag PRO** works for you

## Warnings

1. Keep the device out of the reach of children and pets. Small parts may cause choking or serious injury if swallowed.
2. Turn off the device in potentially explosive environments.
3. Never use near flammable substances.
4. Turn off your device whenever you are directed so by warning signs or instructions.
5. Your device could cause explosions or fire in the vicinity of highly flammable fuels or areas of storage and transport of chemical substances, as well as in areas of explosion.
6. Do not store or carry flammable liquids, gases or explosive materials in the same area as the device.

#### Batteries and accessories:

1. Never throw the device into the fire. Deposit device in accordance with the regulations.
2. Never store the device in heating devices, such as microwave ovens, stoves, or radiators.
3. Do not leave the device for a long time in direct sunlight. Battery may explode if overheated.
4. Never crush or puncture the device. Avoid exposure to high net external pressure, which can lead to an internal short circuit and overheating.
5. Avoid exposing the unit to very cold or very hot temperatures. Extreme conditions may adversely affect the battery power and the battery life.

## Maintenance

1. Use the device only as described in the User Guide. Do not make any intervention on the device. User must not open or change parts inside device.
2. Device servicing by unqualified personal may result in damage to the device and will void the manufacturer warranty.
3. The device is not waterproof and should not come in contact with water. It should be stored in a dry place. Liquids can cause serious damage. Water damage may void your manufacturer's warranty.
4. Protect the device against physical impact. The device is not designed for rough handling, which increases the risk of damage to the plastic housing and internal electronic circuits.
5. Do not use chemicals, solvents, strong detergents or excessively wetting in order to clean the device. The device can be cleaned with a soft, well-wrung cloth.

## Servicing

1. Secured service, spare parts and battery cartridges from the manufacturer.

## Warranty

1. The warranty starts from the date of purchase of the device and lasts 24 months.



2. In the case of device failure within 24 months from the day of delivery, manufacturer will repair device or replace it with the other with the same or similar characteristics within 15 days from the day of malfunction notification (delivery and post service is not counted).
3. The guarantee does not apply to the battery cell.
4. The guarantee will not apply in the case of mechanical damage of device, as in the case of intervention on the device by unauthorized persons.

## Additional Information

For any further information please contact:

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Aleksandar Stojimirovic, M.Sc.EE

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E-mail: [belmag9@gmail.com](mailto:belmag9@gmail.com)

# BelMag



### Credits

For development of this device and software it was used Open Source tools and components. You can find the source code of their open source projects along with license information below. We acknowledge and are grateful to these developers for their contributions to open source.

wxWidgets (<http://www.wxwidgets.org/>)  
CodeBlocks (<http://www.codeblocks.org/>)  
GCC (<https://gcc.gnu.org/>)  
KiCAD (<http://kicad-pcb.org/>)  
USBPicProg (<http://usbpicprog.org/>)  
FreeCAD (<http://www.freecadweb.org/>)  
Blender (<https://www.blender.org/>)  
Inkscape (<https://inkscape.org/en/>)  
Elmer (<https://www.csc.fi/web/elmer>)  
OpenOffice (<http://www.openoffice.org/>)  
Scribus (<https://www.scribus.net/>)  
Notepad++ (<https://notepad-plus-plus.org/>)  
VirtualBox (<https://www.virtualbox.org/>)  
TinyXML2 (<http://www.grinninglizard.com/tinyxml2/>)  
HelpMaker (<https://sourceforge.net/projects/helpmaker/>)