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User manual

NMR-03

Non-Magnetic and Non-Reflective Tower up to 4 meters

applicable to version 1.0 of NMR-03

MPB 2021 ver. 1.05

Release history

Version	Description
1.0	First version
1.02	New mounting details
1.03	New mounting details
1.04	New mounting details and options
1.05	Added Advanced version

SAFETY NOTES

Read before using the product

MPB works to provide the best safety conditions available and complies with the latest safety standards.
The instrumentation described in this manual was produced, tested and left the factory in conditions that fully comply with European standards.
To ensure the correct use of the product, these general instructions must be read and applied before and for any use of the instrumentation.
The NMR-03 is made for industrial environments and laboratories and should be used by authorized staff only.
MPB disclaims any responsibility for a use of the device different from explained in the manual.

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1. General information

The NMR-03 is a tower for the support of sensors and antennas in environments where no metallic or reflective materials are allowed. Entirely made of fiberglass tubes, DELRIN, ABS. PEEK, polyethylene and Nylon. This non-magnetic and non-reflective system, does not affect the measurement of the emitted field.

2. Technical specifications

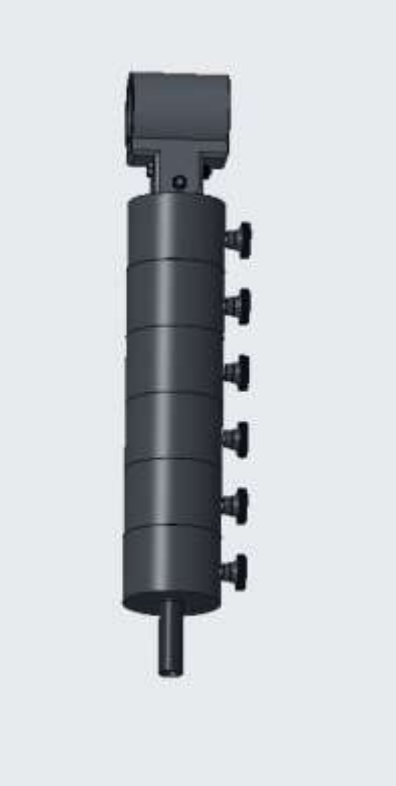
Max adjustable height	4 m
Min adjustable height	0.8 m
Max payload	10 Kg max depending on the conditions. Ask for the antenna positioning condition details
Lift	Winch manual or motorized with safety autoblock system.
Tower positioning base	Leveling with adjustable feet or wheels
Polarisation	manual
Operationg temperature	From -10°C to 50°C
Dimensions	0.8 x 0.8 x 4 m
Weight	20 Kg
Materials	Fiberglass Tubes Nylon and PEEK bolts and nuts DELRIN counterweight ABS components NYLON PA12 Paracord rope polyethylene base

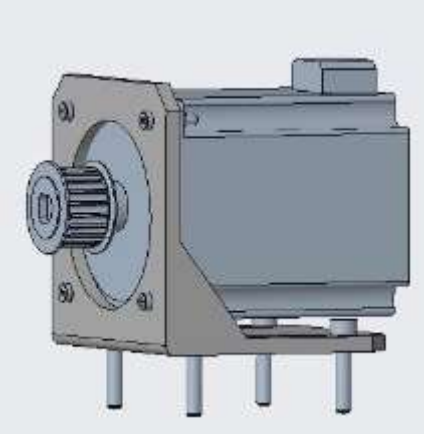
3. Components

NMR-03 Base	
NMR-03 T650	
NMR-03 hub	

NMR-03 upper junction poles	
NMR-03 2T2000 down	
NMR-03 2T2000 up	
NMR-03 pole joint	

NMR-03 sliding support	
NMR-03 Horizontal bar	
NMR-03 winch. Cut the	
NMR-03 threaded bar	
NMR-03 rope	

NMR-03 Counterweigh t group with M8 knob M8x60mm screw. Each counterweight can be insert or removed as desired	
NMR-03 Ball lifting unit	
NMR-03 Belt tensioner device	

NMR-03 motor NEMA 34	
NMR-03 driver	
NMR-03 optic link	

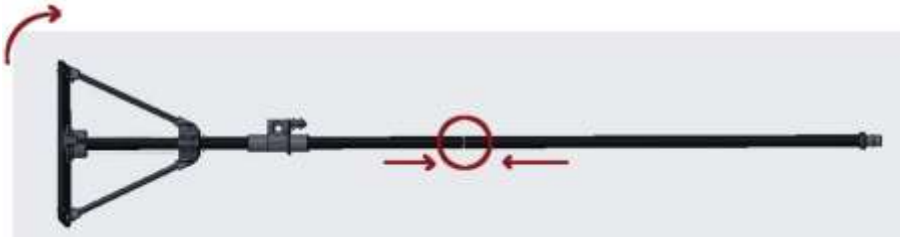
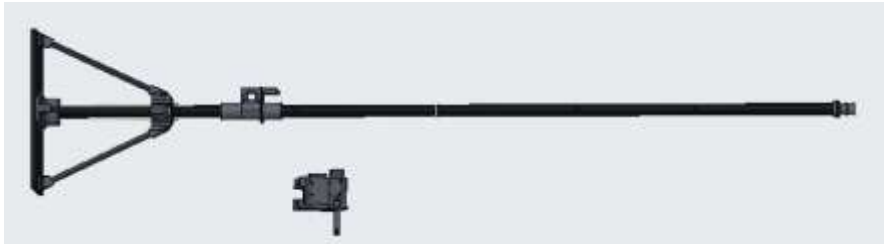
4. Mounting

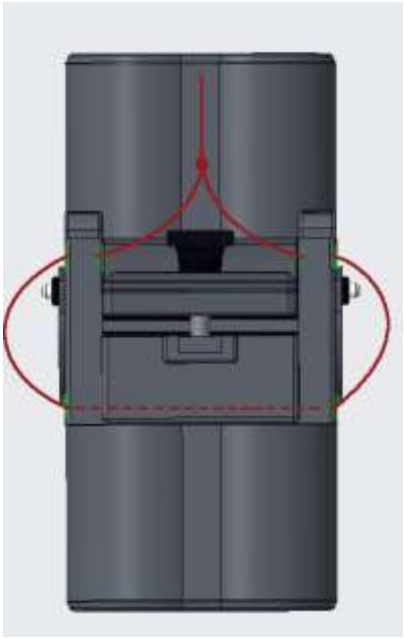
Follow the steps below to mount the NMR-03 in the easiest and most comfortable way

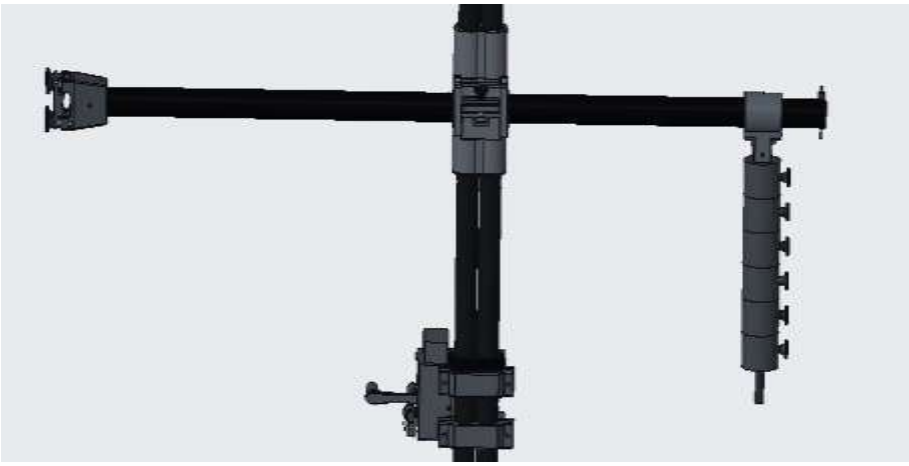
Step 1 Place the base on a flat surface	
Step 2 Insert T650 on the base	
Step 3 \Place 2t2000 down on the ground and insert the pole joint	

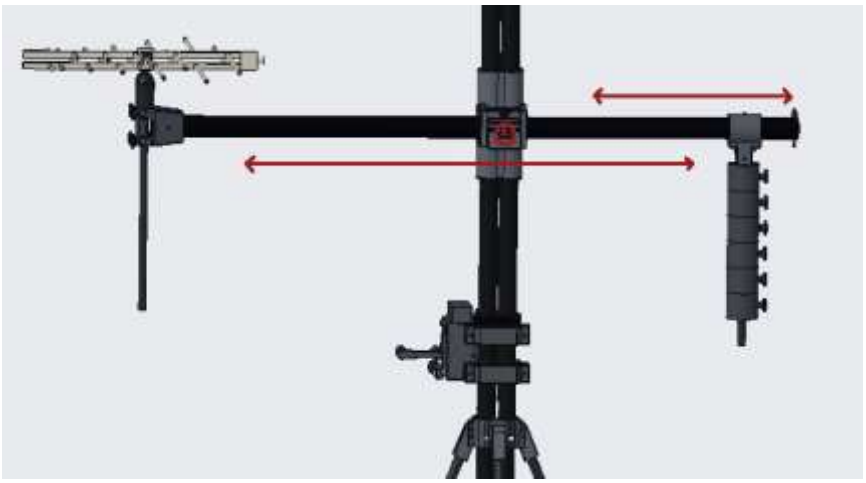
	
Step 4 Insert the hub top and the hub on the 2T2000 down.	
Step 5 Insert the sliding support on 2T2000 down	

Step 6 Insert the assembly of step 5 on that of step 2	
Step 7 Insert the threaded bars on the hub and screw on the base. Tighten well them until complete tightening. After that insert the knobs on the threaded bars that	

come out of the hub and tighten	
Step 8 Insert on the 2T2000 up the upper junction poles	
Step 9 Move at 90° the base, and Insert last 2T2000 up as in figure	
Step 10 In the same position of step 9 place the winch on the ground, cut the band on the rope, insert the free end of the rope through the bearing on top of the assembly. temporarily fix the rope at the sliding support	

Step 11 Move the tower in the vertical position and fasten the winch to the desired height with the appropriate supports	
Step 12 Insert the rope into the appropriate holes as shown in the figure. Make 3 knots, place them in the middle of the pole as show in the picture	

Step 13 Insert the horizontal bar in the sliding support. Turn the winch crank to tension the rope. After that cut the band on the winch.	
Step 14 Insert the counterweig hts and relative fixing knobs	

Step 15 Insert the antenna into the clamp and tighten the appropriate fixings. The antenna can be fixed for both vertical and horizontal polarization. Insert the antenna cable into the antenna holder to avoid twisting the cable	
Step 16 Scroll horizontally with the counterweig hts and with the bar to balance the weight, refer to the level placed in the highlighted point	

Step 17 Lift the antenna with the winch to the desired height	

5. Options

5.1 Mobile base with ball lifting unit

5.2 Motor for automated lifting of the antenna through management software

the motor and the optic link control are constrained to the base.

the winch is moved by timing belt and pulleys. The lifting device of the winch allows the management of the belt tension.

6. Software

6.1 Safety warnings

Please note that this manual was written according to software version V 1.0.7.0

Because of the nature and the purpose of the NMR03 it is not possible to install device that detect the possible presence of the operator during the operations. It is not allowed to anyone to stay in the action range of the pole when it is operated.

6.2 Prerequisites

In order to properly install and utilize the software it is recommended to have at least the following configuration:

6.2.1 PC requisites

- Intel I3 cpu x64
- 4 gb RAM
- 10 GB hard disk space
- 1 free USB connector

6.2.2 O.S. requisites

- Windows 10

6.2.3 Framework

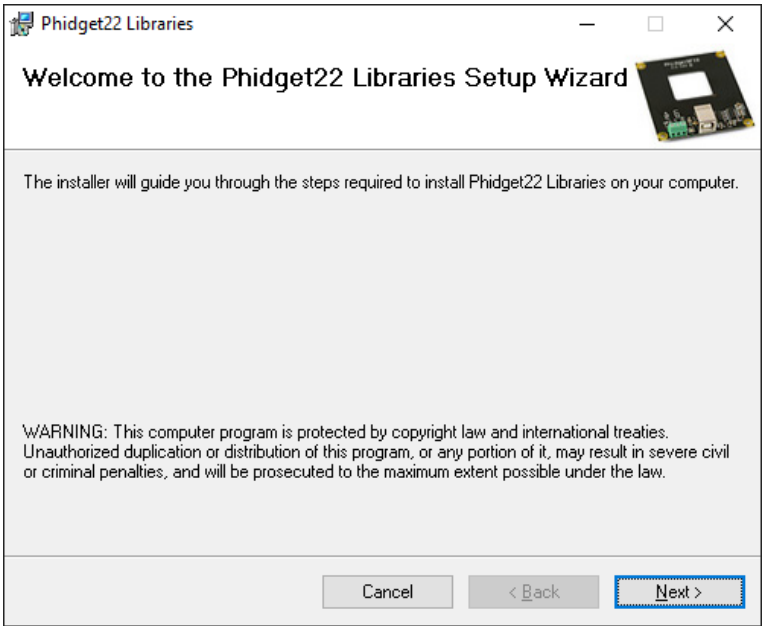
- .NET framework 4.5.1

6.3 Installation

In order to use properly the software, it is necessary to install “Phidgets driver” before run the software otherwise the software will not be able to communicate with the hardware.

6.3.1 **Phidgets driver installation**

In the installation folder it’s present a file “Phidget22-x64_1.6.20210222” or a successive release.



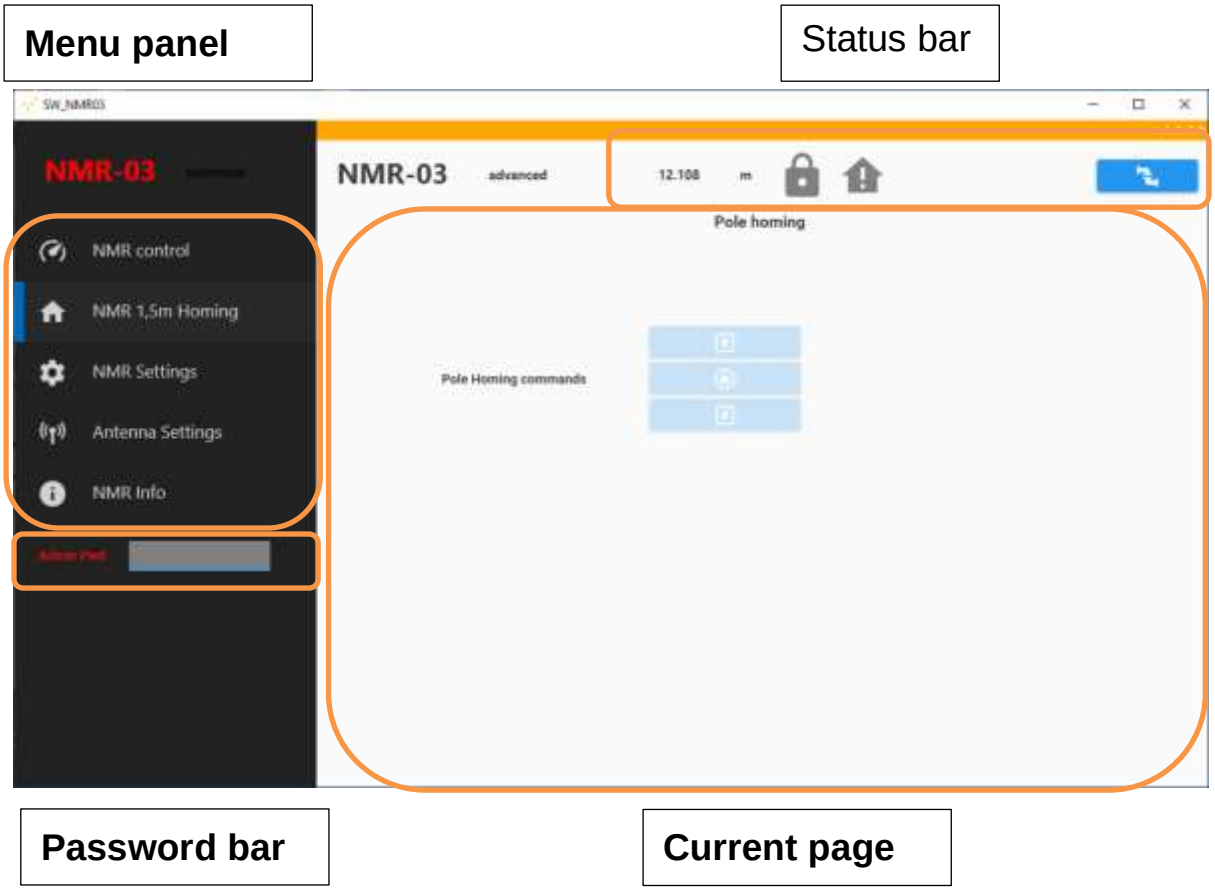
Launch the install program and follow the instruction. At the end of the setup the software may ask for an automatic update.
Windows maybe show a security warning about a not thrusted author of software.

6.3.2 **Software installation**

Launch the install program and follow the instruction.
Windows maybe show a security warning about a not thrusted author of software.

6.4 Use

6.4.1 Interface description



Status bar

From the left to the right

- Odometer
- Locked – un-locked icon
- Homed – un-homed icon
- Moving warning icon (blinking) (not showed in current image)
- Connect - un-connect button

Menu panel

- NMR Control button
- NMR 1,5m Homing button

- NMR Setting button
- Antenna setting button
- NMR info button

Password bar

Current page selected

6.4.2 First start-up

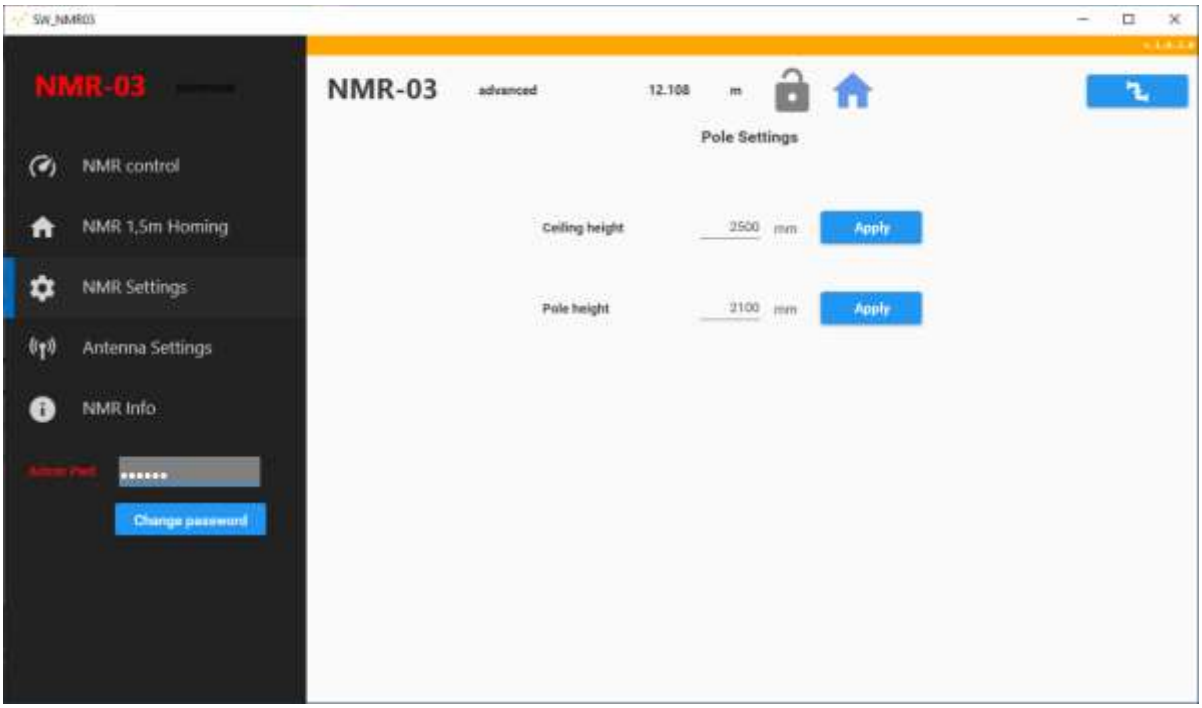
The first time you will launch the software there will be two warning, one about the missing config of the pole and one about the missing configuration about antennas. These data are needed by the software to calculate maximum and minimum altitude. Therefore, it is very important that this data are accurate. If this data are not true the antennas can crash whit the pole, the ceiling or whit the floor or then antenna mount can exceed the max travel and consequently break the gears.

Attention: run the file as administrator

6.4.3 Configuration

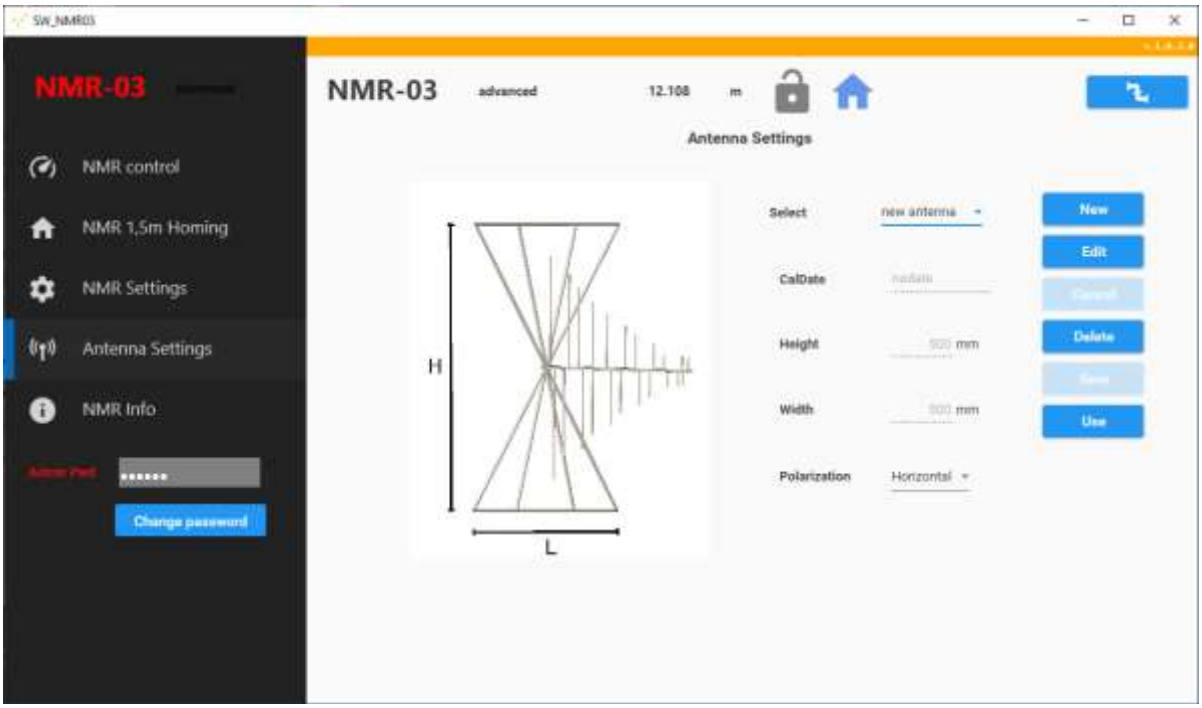
To enable configuration it is necessary to insert the password in the password bar and press enter. It is not possible to modify config without password to avoid unauthorized operator to change setting and maybe create a potential dangerous situation.

NMR Settings



To set Ceiling and-or Pole height insert the height (in mm) in the corresponding text box and press the corresponding button apply. Ceiling height setting it's necessary to avoid antenna crash in the ceiling and pole height it's necessary to avoid antenna mount exceed the maximum stroke.

Antenna configuration and use



It's possible to create a max number of 20 antennas. The antenna data are necessary to compute the max height and minimum height reachable, so **it's very important to select the correct antenna and polarization before star moving.**

6.4.3.1.1 Create a new antenna
To create a new antenna click "New" button then modify the parameters as necessary and then click save, otherwise click cancel.

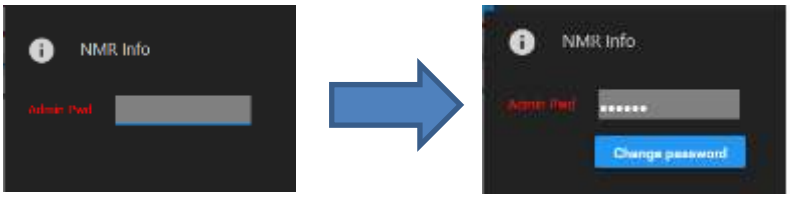
6.4.3.1.2 Modifiy antenna
To modify an antenna select it from the combobox and then click modify. After all necessary modification click on save.

6.4.3.1.3 Delete antenna
To delete an antenna select it from the combobox and then click delete.

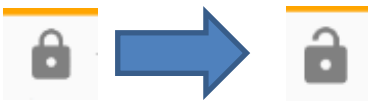
6.4.3.1.4 Use antenna
To use an antenna select the current antenna mounted, select the current polarization and then click Use.

Password

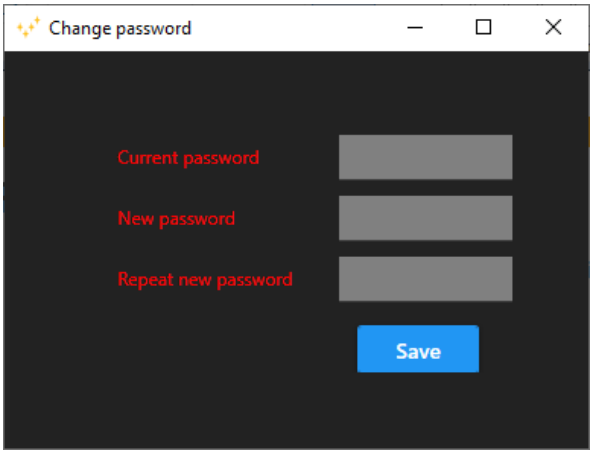
To unlock configuration and antenna selection it's necessary to insert password. To do this click into password text box, type password and press enter.



If the correct password is typed the padlock icon will become unlocked and the password change button will appear.

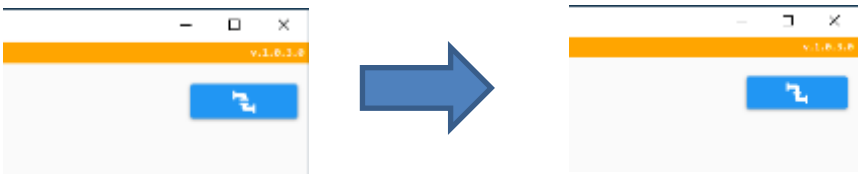


Default password is “MPBsrl”. To change the password press “password change” button; a new window will appear. Insert old password, new password and press save.



6.4.4 **Connection**

To connect software to NMR03 it necessary to connect properly all the cable as seen in the “assembly” section.
After power up the supply of the NMR03 is possible to click on Connect button in the status bar of the software.
If there are no problems, the connect button will change appearance.



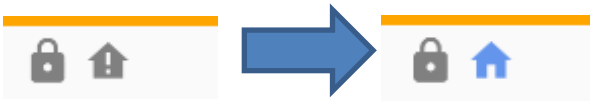
6.4.5 **Homing**

The most important thing after configuration is the homing. For the purpose of the system, it is not possible to have a feedback then the system is in open-loop. Every time the software is connected it’s necessary to homing. This procedure it’s necessary to the software to know the position of the antenna mount. Click on the button “NMR 1,5m homing”, if not connected press the connection button and the buttons in the homing panel will be enabled.

Attention: perform the Zero only after choosing the antenna

Press up or down button to move antenna mount to 1,5m reference.

When the axis is moving in the status bar will be blinking a warning sign and the home button will be disabled.
When the position is reached press “home” button  .
The home icon will change color and shape to show that the system is homed.

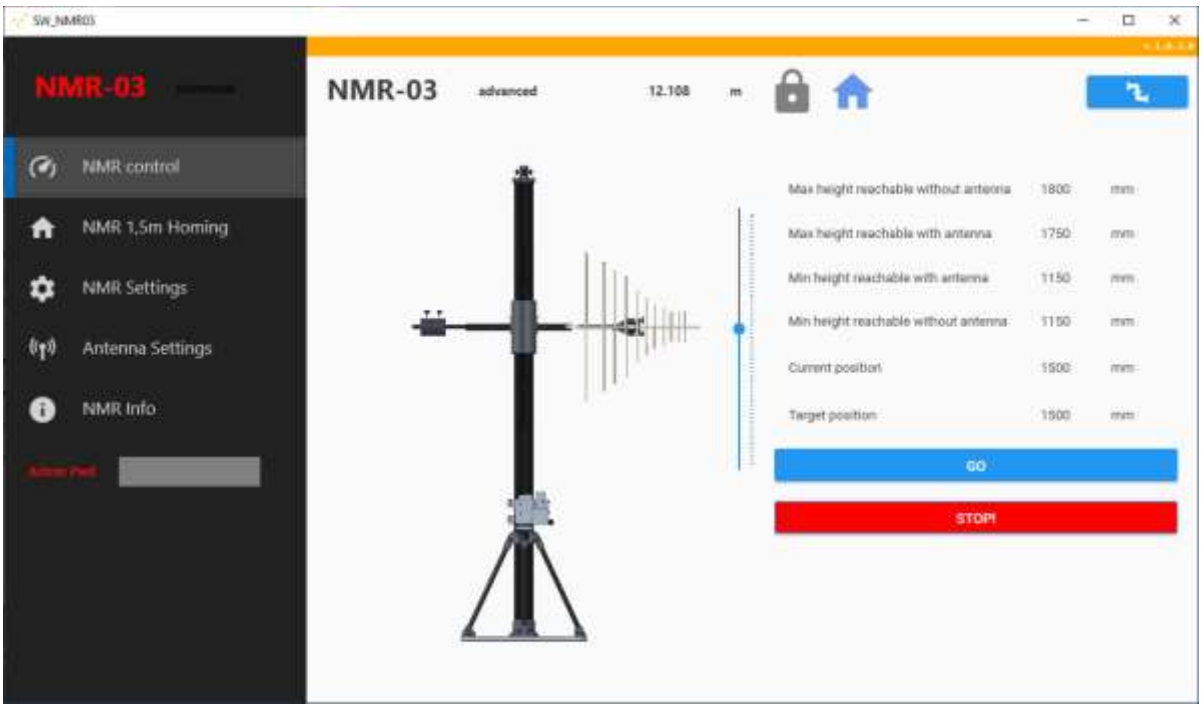


Every time the software is closed or it’s disconnected it will be lost home position and will be necessary to repeat the procedure.
Attention: Incorrect execution of the procedure can lead to damage to the antenna or to the NMR03.

6.4.6 **Moving**

After setup, connection and homing is possible to move NMR03. Click on “NMR control” button to show moving panel.
In the panel on the right of the pole image is present a slider. Moving this is possible to select the desired target position of the axis. After select the desired position click on the “GO” button and the axis will start to move. If it’s necessary is possible to click “Stop” button to stop axis moving. During the moving the axis of the antenna on the screen will move whit the current position of the real axis.

Attention: no one it’s allowed to stay during the moving operation in the operation range of the automation.



In the panel on the right are showed the different height reachable by the automation. These values depend on the configuration of the pole, the ceiling and the antenna. If wrong values are set the system calculate wrong maximum and minimum value reachable, therefore the antenna or the axis maybe will crash.

During the operation it's enable a FailSafe mechanism, the hardware implement a counter that increase at every cycle; the software send a command to reset this counter, if for some reason the software crash or is too slowly and don't send the reset command every two second the hardware enter in a failsafe state, movement are stopper and no more operation are possible until a reset. In this case a message will be showed on the screen and will be necessary reconnect to hardware. Also homing procedure will be necessary because in this case the software lost the current position of the axis.

Odometer

The software implement an odometer to record the total mileage traveled by axis. It's recommended to perform scheduled maintenance every 10.000 meter traveled by the axis.