MNEMO V2

USER GUIDE

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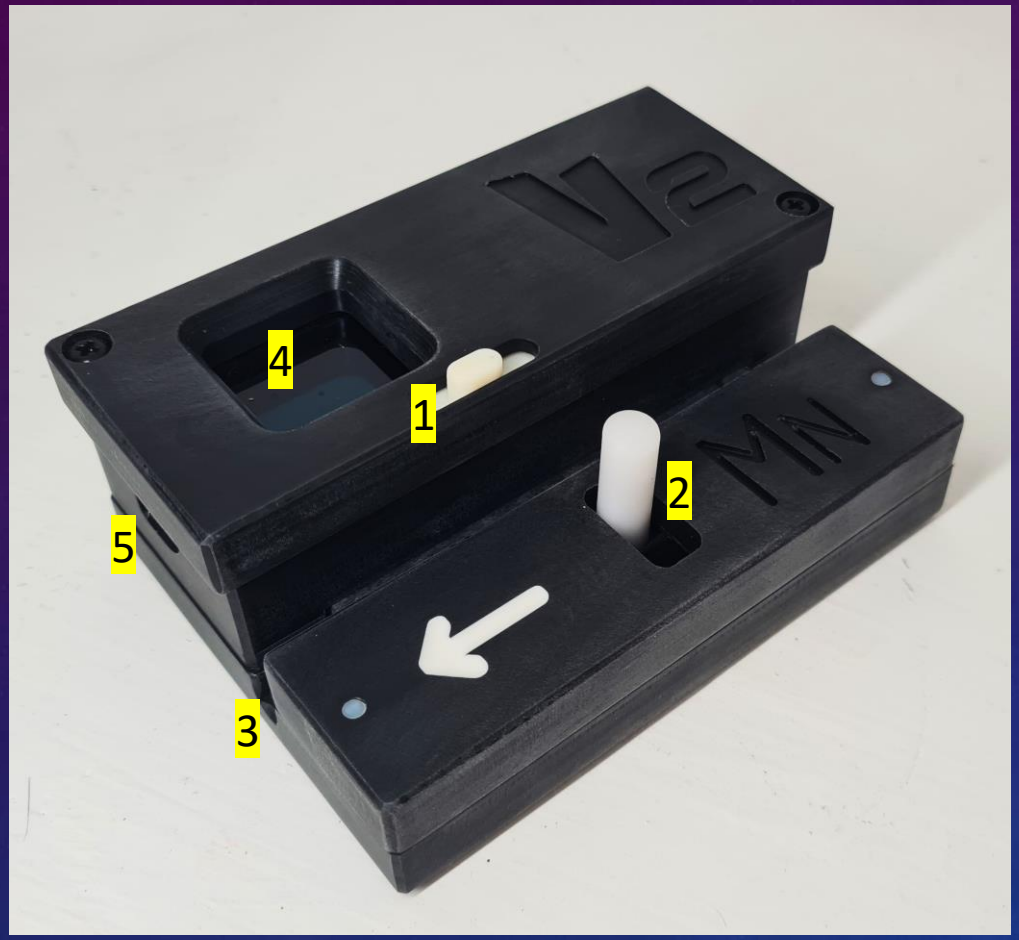
REV 1.3.1

Index



DESCRIPTION

1. Slider Control
2. Pressure plate lever
3. Line slot
4. Display/Color Indicator
5. USB connection

SWITCHING MNEMO ON

- Move the slider control to the left and hold it there until a led turns on, on the right side of the screen. At that moment move the slider to the right and the device will turn on displaying info about the firmware and the serial number of the device.

  Trick: If you can't see the led just count to 6 before moving the slider to the right.

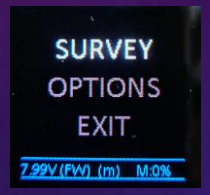
  Settings: You can deactivate the requirement to move the cursor to the right with the "SwitchONSafety" setting in MNemoLink.

- When this appears, it means MNemo has booted properly, and all the sensors are working.
- Move again the slider to the left and you'll be in the main menu.

NAVIGATING THE MENU

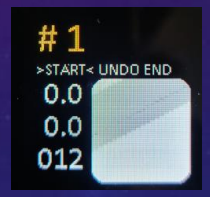
- Each menu will have an active or selected item that will be surrounded by >….< or highlighted in white.

SURVEY
OPTIONS
EXIT



or

>START< UNDO END



- Moving the slider to the right is shifting the selected item to the next one (Either on the right or beneath). In our example, a slide to the right results in :

SURVEY
OPTIONS
EXIT

or

START >UNDO< END

- Moving the slider to the left is equivalent to the “Enter” key of your keyboard. It selects the current item or starts the action highlighted or selected.

MAIN MENU

- You will notice that the bottom line of the menu is displaying a stream of information:

26/03 11:26 27.6ºC Day/Month | Hour:Minute | Water Temperature

7.98V (FW)(m) M:0% Battery Voltage | Type of water | Unit | Memory usage

The date and time format can be adjusted in MNemoLink, the software used to interface the Mnemo with your computer. (available here : MNemo | Cave survey data acquisition | Ariane's Line (arianesline.com))

Note: If the date is not set or set incorrectly it will se adjusted to a default date. You'll get a message indicating this when you turn the Mnemo on.

CALIBRATING THE UNIT

- Before starting a survey MNemo's sensors need to be calibrated and certain parameters need to be adjusted

1. Setting the units used by MNemo (Meter or feet)
2. Selecting the type of water you are diving in (Fresh or Salt)
3. Adjusting the surface pressure
4. Adjusting the line measurement factor
5. Calibrating the Compass

CALIBRATING THE UNIT

- All the settings and calibration are kept in memory when you turn MNemo off.

This is a major difference with Mnemo v1 that required calibration of the compass for each session.

SETTINGS THE UNITS

- From the main menu navigate to

- Select either Metric (using meter and ºC) or Imperial (using feet and ºF)

SELECTING THE TYPE OF WATER

- From the main menu navigate to:

- Choose between fresh and salt water.

ADJUSTING THE SURFACE PRESSURE

- From the main menu navigate to:

- The surface pressure will be automatically adjusted.
- Obviously … DO NOT ADJUST SURFACE PRESSURE IN THE WATER

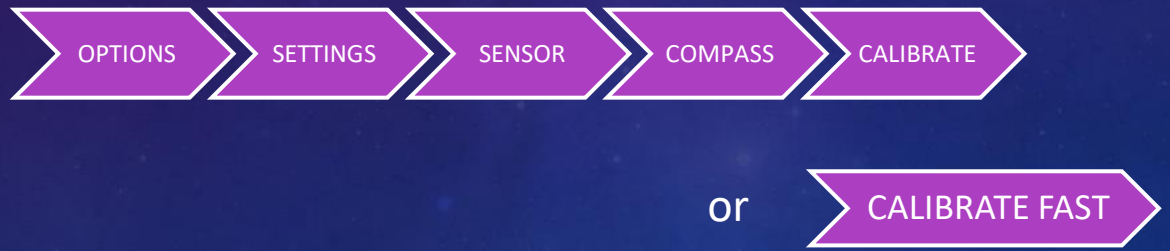
ADJUSTING THE LINE MEASUREMENT FACTOR

- This is set when we assemble and calibrate the device. If you notice a difference in the distance displayed by Mnemo and the real distance of the line you can correct this factor.
- From the main menu navigate to

- Choose + or – to change the distance factor and validate the measurement.
- You can also use the AUTO feature. For that you'll need to put in place a line with markers separated by 5m exactly if the unit is set to METER, or 15feet if set to IMPERIAL. Take a measure between those two markers as if they were two stations. Once done you'll get a message Adjustment : X , X being the adjustment factor. Repeat that operation until you get an adjustment factor of 0 or 1.
- *Note: If at any point you realize that the line measurement is not working anymore, change the parameter WM to the value 1 or 2 instead of 0. Test with each setting which one is working.*

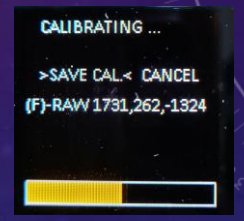
CALIBRATING THE COMPASS

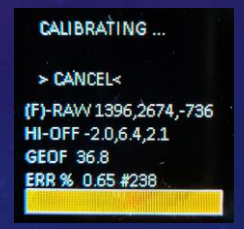
- This is by far the most important calibration of the MNemo.
- You can start the compass calibration in two different ways:
- From the main Menu go to:



CALIBRATING THE COMPASS

- You must rotate randomly the Mnemo on all its 3 axis in order to perform the calibration.
- The display will show a progress bar indicating the advance or the calibration process.





- Once the calibration gets close to completion, you'll have more information displayed on the screen

- The relevant information is the amount after ERR% which indicates how close the calibration brought the compass to the theorical model (uniform magnetic field in any orientation). This value should be smaller than 1%.
- #238 means that 238 samples measurements are taken into account for calibration. This is the maximum amount and we recommend not to stop calibration before reaching that value. GEOF is the approximation of the magnetic field at that location. The compass of the Mnemo is not calibrated to give precise absolute magnetic measurements, nevertheless that gives you an indication of the strength of the magnetic field at your location and should be close to the theorical value (NCEI Geomagnetic Calculators (noaa.gov))

CALIBRATING THE COMPASS

- To have a precise and correct calibration it is CRUCIAL to be far away from any magnetic or electromagnetic disturbance, in particular :

  Scooters, steel tanks, compasses, dive computers, dive light canisters

  But also:

  Electric line, cars, any electric motor etc …

- I can’t insist enough on the fact that there’s NO WAY to get a precise survey without a precise and correct calibration. For example, in our office we can’t calibrate the compass on my work desk, which has a metallic structure, and two computers on it. The average calibration time is 1min in fast mode and up to 10min in standard calibration. If the calibration is not finished after 10min, turn MNemo off and on again and restart the calibration.

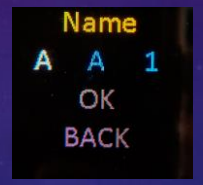
SELECTING THE SURVEY MODE

- The Mnemo has two survey mode, you can select which one you preferably want to use in

- **BASIC** : This mode allows less options but it does not require from you to read the display, just see the background color. WITH A BIT OF PRACTICE THIS IS THE MOST EFFICIENT MODE TO USE IN ANY CONDITION.
- **VERBOSE** : This one is easy to start with and offers the full range of options. It requires to have the possibility to read the text on the LCD.

STARTING A SURVEY – VERBOSE MODE - NAMING THE SECTION

- From the main menu select 

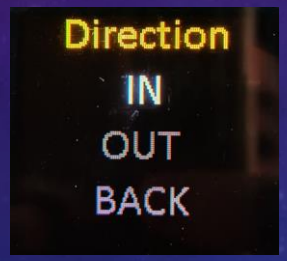
- The screen will display options similar to: 

- In this menu you can choose the name of the section you are surveying. Section in this case means the section of the survey which can differ from the section of the cave you are working in.

In our example the section is called AA1. You can navigate from one letter to the other moving the slider to the right and change the current letter by moving the slider to the left. Once done select OK.

STARTING A SURVEY
CHOOSING THE DIRECTION

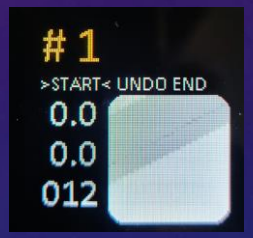
- The menu will display two options, select which direction you are surveying, IN or OUT.



NOTE : The reference shot that you had in Mnemo v1 are no longer used in v2

SURVEYING A SHOT

- Once all is set, here comes the easy part !
- To survey a shot, pull the pressure plate lever, insert the line into the slot, release the lever, making sure the line is not trapped. Slide the device to the beginning of the shot (Entry Station)
- Select START



- The display will show a RED square:

- At that point the device is waiting to be stabilized to measure the azimuth.

Don’t hold the device in your hand, rather support it from beneath so it can use the tension in the line to self align and take the most accurate measurement possible.

SURVEYING A SHOT

- The display shows a blue or purple square with a dot in it when the compass has taken the first azimuth. You can now move the device along the line all the way to the next station. The display will be flickering that BLUE/PURPLE square indicating that the wheel is spinning and measuring the length of the line. The device measures the line in both direction allowing you to compensate for big diameter tie-offs. If the line is too loose the length reading will be incorrect.

  NOTE: You can use Mnemo v2 in reverse direction of the engraved arrow, the device will automatically reverse the azimuth

- If the device is flickering BLUE/RED that means it has been dragged along the line before the stabilization phase was over, you should start the survey of that shot again.
- When you reach the next station, select STOP
- The display turns red waiting to stabilize and measure the second azimuth.

SURVEYING A SHOT

- Repeat the operation …
- Once you reached the last shot select 

- This will save the section. You are back to the main menu ready to survey the next section !

ABOUT STABILIZATION

- In which ever survey mode you use the Mnemo the stabilization phase is indicated by red background color.
- If during stabilization the red background starts flashing, that means the device is not flat enough (ie. rolling too much on one side or the other). In this case rotate the device around the line until the blinking stops, then stay stable and the measure will be taken.
- If the inclination of the line is lower the 45º, the rotation tolerance is quite large (about 30º on each side of the line)
- For line with high inclination (typically in vertical sections of the cave), the tolerance has been extremely reduced (only 1º) allowing by the same to have a much more precise reading of the azimuth despite the high inclination. In such a case slowly turn the device until it is flat, otherwise the measure won't be taken. It may take a little bit of time (10s max) but the result is worth it.

CANCELLING/RETAKING MEASURES

- If you want to retake a measure, there are two options:
- Either you are still in reading mode (BLUE/PURPLE background), in this case just select BACK and you can retake the measure you were taking.
- You finished the measure (WHITE background waiting for next measure), in this case you can select UNDO to erase the last saved measure and take it again.

SURVEYING – BASIC/WHEEL MODE -

- From the main menu select SURVEY

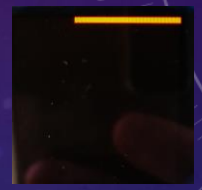
NOTE: The KNOT mode of Mnemo v1 has been removed

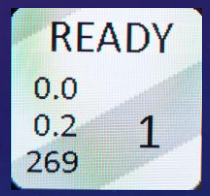
- You'll notice a flashing green screen displaying STANDBY.

SURVEYING – BASIC/WHEEL MODE -

- From now on you don´t need to be able to read what's displayed on the screen. The color alone will give you enough information on which phase of the survey you are in.

  NOTE: In BASIC mode the slider button doesn't work by impulses, but you'll have to hold the slider during a certain amount of time (more or less 2s). A green indicator on the top screen will show the progress, the order only gets validated once the indicator is complete.



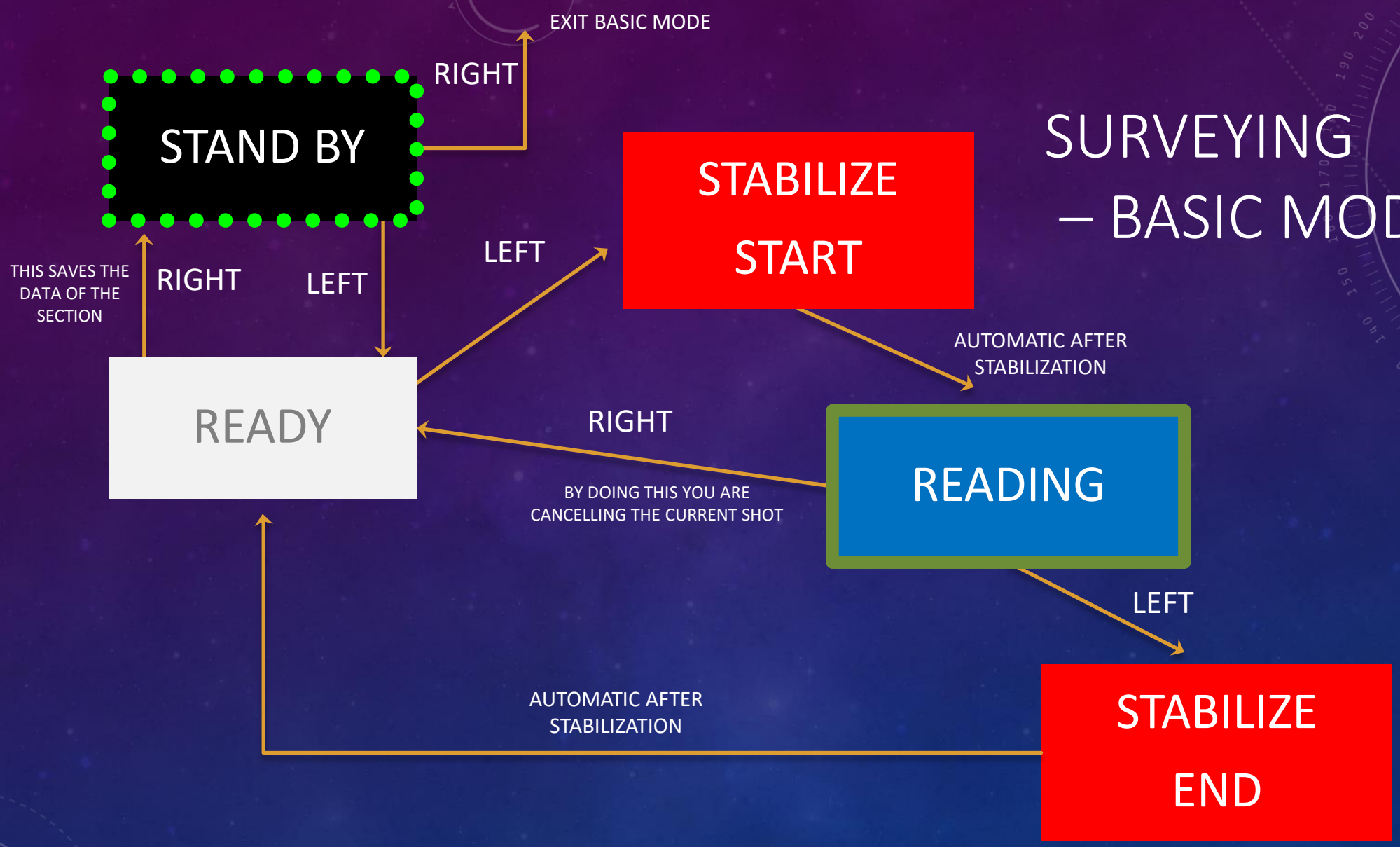


- From STANDBY mode, to start a section hold the slider left the screen turns WHITE, this indicates READY mode. By default, in any BASIC survey mode all surveys are recorded IN and are named "BAS". You can then later sort out the data on your favorite survey software.
- Clip the device on the line at the beginning of the first shot.
- Hold the slider left the background turns RED, you are in STABILIZE mode (same as in Standard survey mode). Once stabilized, the device goes in READING mode, you can now move along the line, you'll recognize the flickering BLUE/VIOLET square you already had in Verbose survey mode indicating the wheel is measuring the line.

SURVEYING – BASIC MODE -

- Once you reach the end of the shot hold the slider left again, the background turns RED, you are in STABILIZE mode. Once stabilized the background becomes white again, you are back in READY mode.
- You can repeat the operation for the following shots.
- Once you have finished the section, when you are in READY mode, to save the section move the cursor to the right. This will save the data and put the device back in STANDBY mode (Blinking GREEN).
- To exit BASIC survey mode, from the STANDBY mode, hold the cursor to the right during 3s.

SURVEYING – BASIC MODE -



SURVEYING –INTERFERENCE MARKER-

- During your survey, if you see an icon of a magnet flashing on your screen, that means the device has detected a magnetic interference. That flashing will only last for 5s, when it stops it doesn't mean the problem is gone, just that you were warned. In such a case make sure that none part of your equipment has magnets or other elements that could strongly interfere with the compass.

SURVEYING –THE BIG PICTURE-

- An important thing to remember is that once you are using MNemo it is not necessary to read the display for each operation, the color will indicate the operational phase. Familiarity with MNemo allows your focus to be on the safety of your dive and a global cave/environment awareness. BASIC mode makes it even easier, we recommend that mode for all your surveys.
- With a bit of practice you can survey at the same speed you'd normally swim in a cave (15-20m/min).

MNEMOLINK -TRANSFERING DATA TO YOUR PC/MAC

- The Mnemo is supported on Microsoft Windows(>7), Apple Mac OSX (>10.6) and Linux (Kernel >5.0.0)
- Currently there's no driver installation required for the Mnemo on any of the supported operating system.
- MNemoLink is the software that interfaces your Mnemo v2 with your computer, allows the download of the data as well as the visualization of the survey. It also allows to adjust certain settings that are not available on the Mnemo menu. Download the software on http://www.arianesline.com/mnemo/

TRANSFERRING DATA TO YOUR PC/MAC - CONNECTING MNEMO TO YOUR COMPUTER-

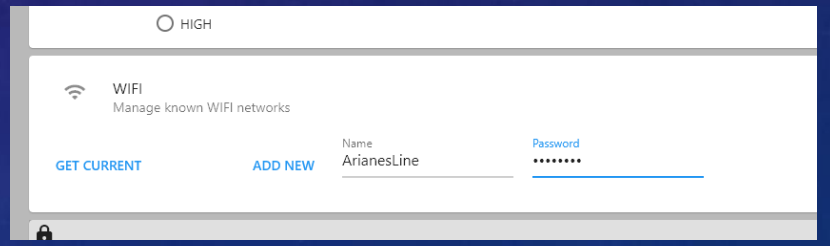
- Connect the USB cable to the device as shown on the picture and then to your computer. The order is important.
- The blue led indicates that the connection to the computer/charger was successful.
- Turn on MNemo. At that point your computer should have recognized the device.

TRANSFERING DATA TO YOUR PC/MAC - TRANSFER–

- Launch MNemoLink.
- If “Mnemo not detected” appears in the right corner, make sure the connector is properly placed on the Mnemo and the device is turned ON than restart the application.
- If the connection is successful, you should have the serial number of your device displayed in the upper right corner.
- The Data tab will give you options to download and save the survey data contained on the MNemo as DMP or Excel.
- The Setting tab will give you access to different settings of the Mnemo that are not accessible through the settings Menu. Most of those are self explanatory. The ones locked are factory settings that should not be modified.
- MNemoLink will save the data on the device in an Excel sheet. You can then copy-paste it in your favorite mapping software.

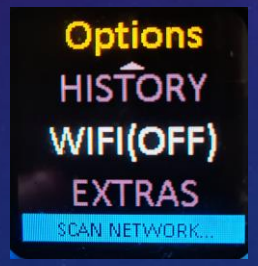
TRANSFERING DATA THROUGH WIFI

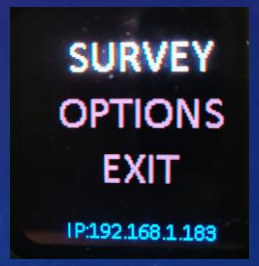
- Connect your Mnemo to your computer and open MNemoLink. In the Settings Tab you can manage the known Wi-Fi networks.
- Click Get Current to get the list of the current networks. (This list is empty when you buy the device)
- Enter the name and the password of your network:
- Press Add New and the network will appear in the list.



TRANSFERING DATA THROUGH WIFI

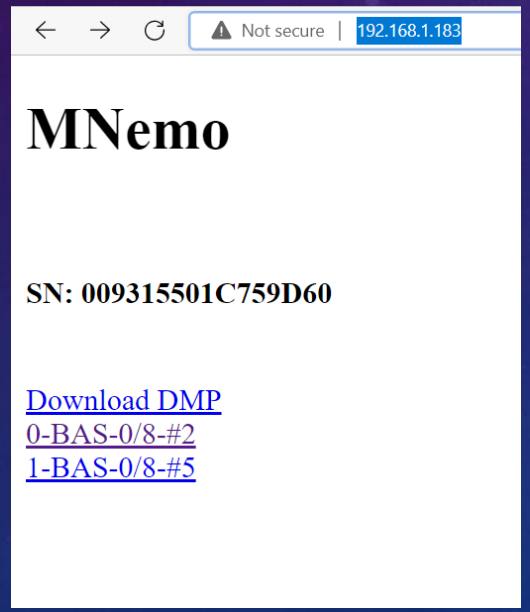
- On your Mnemo navigate to OPTIONS > WIFI(OFF)
- The Mnemo will than try to connect to the known networks. If successful it will come back to main menu and display the IP address of the device.

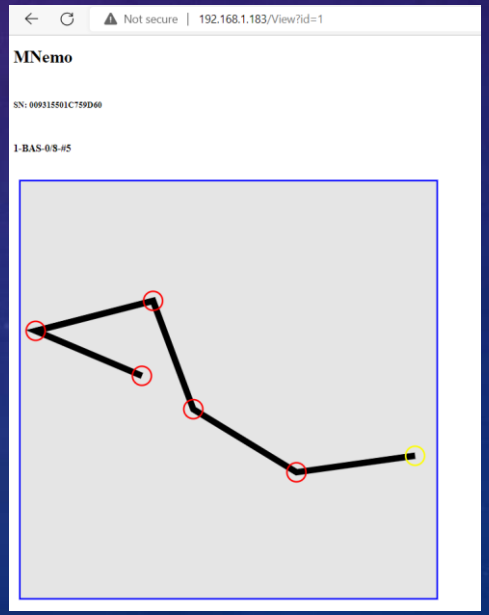




TRANSFERING DATA THROUGH WIFI

- You can now navigate in your favorite internet browser to the displayed IP and click on the Download DMP link or preview the surveys:



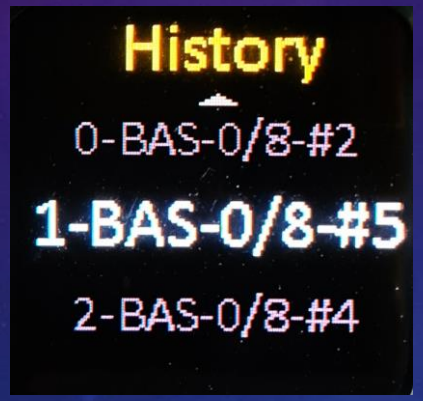


VIEWING SURVEYS ON THE MNEMO

- At any time, you can access the latest survey, or the survey being done by double taping the back of your Mnemo. It will display a map that will orientate according to the orientation of the device if you are in survey mode, otherwise oriented north. Give an impulse left to the slider button and you will have screen display info on the survey. One more slide and you are back where you started from. This feature can be deactivated with the “Double Tap” setting in MNemoLink

VIEWING SURVEYS ON THE MNEMO

- You have access to the survey in memory in the OPTIONS > HISTORY
- From there on you can select the section you wish to display



ERASING MEMORY

- Mnemo can save around 5000 measures. You can erase the memory by going to

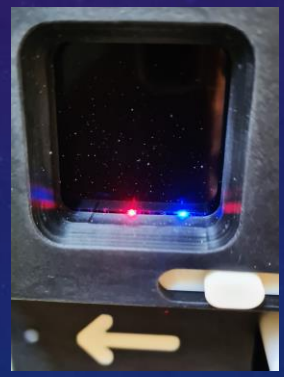
- This operation CAN NOT be undone.

LCD ORIENTATION

- You can adjust the orientation by going to :

CHARGING THE BATTERY

- The Mnemo can be recharged using either the USB port of your computer or a dedicated charger. It requires no more than 150mA charging current.
- The red LED indicates that the charge is in progress. It will turn off when the charge is complete.
- It is recommended to have the Mnemo turned off before connecting for a charge. Note that if the device is on and connected to a charger, it will not turn off when you select EXIT in the main menu but simply go into Energy Saver mode (The screen will turn off but the led on the right side of the screen will stay on)



TIPS AND TRICKS

-Wheel jamming:

This is of course always a possibility with old/dirty line and the main contributing factor will be the lack or little tension of that line. If you notice the wheel is not spinning first check if the line has enough tension and if possible, adding an extra wrap on a tie off to increase the tension often solves the problem.
Otherwise, a way of unblocking the wheel is to hold the line in a hand, increase the tension and then swiftly roll back and forth the mnemo to clean the wheel, that should do the trick probably in 90% of the cases. Of course, after that you'll have to resurvey that shot.

-Obstacles on the line:

It is important to know that the device measures distance whether you move it forward or backward. This is done intentionally. In case you have an obstacle on the line (thick knot, arrow etc ..) , roll the mnemo all the way to the obstacle, then back the length of the obstacle plus the size of the Mnemo. Unclip it from the line (do not stop the survey or add a station) and clip it on again after the obstacle. Resume rolling the device until you reached the next station.
Like this there is no loss of time to rearrange the line.

TIPS AND TRICKS

-Compensation for thick tie wraps:
You can compensate the loss in measurement of the round part of a large tie wrap by rolling back the device the estimated distance that is missing.

-Display or not display :
We recommend all user of Mnemo to get familiar enough with the device to use only the colors of the screen and not read the menu at each station. This will increase the smoothness of the process and allows them to focus on stabilizing and clipping on and off the device.

-Opening the pressure plate (gate)
If you are using the strong central spring and have difficulty manipulation the pressure plate, brute force WON'T help. Hold the white lever between thumb and index, apply a rotational force forward and THEN pull backward. Although this configuration is hard to operate it is also the one that offers the safest grip on the line

-Organizing work, multiple sections
I personally call all my section AA1 or use BASIC mode. In most cases I can remember what I survey and in which order. In more complex scenario you can either take the time to change the name of the section or write on a slate complementary information.

MAINTENANCE

- DO NOT LET THE BATTERY DRAIN COMPLETELY. Put it on charge (leave connected to your computer or other USB charger) once per month even if you don’t use the device.
- After each use thoroughly wash MNemo with fresh water, do not use any other chemical product. Ideally have MNemo clipped on a piece of line and move it forward and backward so that the wheel gets cleaned everywhere as well. Also move the pressure plate lever while washing.
- If you have the feeling there still is sediment trapped in the base of the device or in the screen cover, you can unscrew both parts to clean them directly.

UPDATING MNEMO

- Download the latest firmware on Github (It's a file with a .UF2 extension)
- Connect the device to your computer and go to

- The device should appear in your file explorer as a USB Memory stick would. Simply copy the firmware file you downloaded there. That should trigger a reboot of the Mnemo and install the new firmware.
- After updating the firmware, **disconnect from the computer and turn off the MNemo**. The next time you turn the Mnemo on the new firmware will be fully functional.

EXTRAS

- Navigate to : OPTIONS > EXTRAS
- You'll find a list of Tools
  - GAUGE: A depth gauge indicating depth and absolute pressure
  - CLICK DBG: A tool to adjust the sensibility of the Slider Button
  - COM DBG: Access to the error log
  - TEST: A mode to test the reading of all sensors
  - ONE-GO(OFF): NOT DOCUMENTED, leave on OFF
  - WIFI_AP(OFF): When turned on will create a Wi-Fi access point to read the data on the Mnemo without access to local Wi-Fi network
  - MAGNETO: Magnetic analysis tool (See next page)

EXTRAS - MAGNETO

- You can use the Magneto to analysis how strongly your dive equipment affects magnetic reading. The standard magnetic fields goes from 25uT to 65uT. By moving the Mnemo closer or further from your equipment you'll get a reading of the strength of the magnetic field that is created.

Here you can see that the magnetic field is between 32.92 and 33.44 when the device is left without any outside disturbance

When we move a dive light around the Mnemo the magnetic field this time is between 30.55 and 37.49 which is a huge difference !

REBOOTING MNEMO

- In rare occasion, usually when the connection between the Mnemo and the computer gets interrupted, the device becomes irresponsive. In such a case you can force the device to shut down by applying a small magnet on the back side of the Mnemo at the level of the display.

TECHNICAL DATA

- Weight: 540g
- Buoyancy (fresh Water): -50g
- Size : 13x10x5cm
- Material : Acetal, PTFE, ABS, crystal clear epoxy
- Depth rating : 290m
- Cave line requirements :
  - Thickness : 1mm to 5mm
  - Knots : allowed if overall diameter smaller then 5mm
  - Tension : minimum 5N
  - Optimal : #21 or #24 nylon braided line without knots and 25N tension
- Accuracy :
  - Depth : 10cm
  - Length : 0.5% of total length +/-1.8cm
  - Heading : 1.2°
  - Loop closure: expect around 1% of error
- Sensors:
  - Depth -> Temperature compensated new generation of high-resolution altimeter sensor
  - Length -> Quadrature encoder infra-red optical detector
  - Compass: RM3100 sensor coil based with hard and soft iron compensation.
- Memory: +/- 5000 shots
- Battery : Rechargeable+Factory Replaceable Li-ion 400mAh- 10h stand-by, 5h reading, 2 months in sleep mode
- Software requirement (min.) : Windows 7, Mac OSX 10.6, Linux 64b (kernel >5.0.0)
- Firmware Update : yes.
- Accessibility : Device can be operated with one hand.
- Warranty : 1 year excluding shipping costs for repair/replacement.
- RoHS category 9 compliant.
- Hand assembled, adjusted and calibrated in Mexico.

Component country of origin: Germany, Switzerland, USA, Thailand, China