ERCOLINA POWER METER DISPLAY

FOR ERCOLINA UPPER BODY POWER MACHINE

This page is intentionally left blank

This page is intentionally left blank

CONTENTS

This page is intentionally left blank

1. **ERCOLINA POWER METER OVERVIEW**

The Ercolina Power Meter is an add-on option to the Ercolina Upper Body Power training machine (post 2007 magnetic models only). It is designed to measure and track the athletic performance of a skiier's arms during training with the Ercolina Upper Body Power machine. The performance of each arm is independently measured. Dedicated software computes:

   -the instantaneous speed of each arm in km/hr,
   -the distance covered in meters (average of both arms),
   -instantaneous cadence for each arm in pushes/min.,
   -average force for each push (in kg-f for each arm) and
   -average power for each push in watts for each arm.

The Ercolina Power Meter gives all these measurements for both double poling and diagonal technique. The internal memory retains the total number of pushes, distance covered and speed even when powered down.

The Ercolina Power Meter weighs 500g and is powered by four AA batteries (that permit 4 hours of training). Optionally, a wall adapter can be used to provide unlimited operation time. There is also a USB update interface that can be connected to a PC for firmware upgrades.

Upgrades are released periodically, where we add new screens and functionality. Note that if you (the User) have special training needs, special custom-designed screens and functionality can be provided on request.

The Ercolina Power Meter can be ordered pre-installed on a new Ercolina Upper Body Power machine or can be easily retrofitted by the user onto an existing machine (post 2007 magnetic models only). This installation takes approximately 15 minutes.

1.1 *Components*

The Ercolina computer is provided with the following parts:

1x Central Unit, 2x Sensor strips, 3x pieces of adhesive square tape, 2x Magnets, 2x Cables for connection, 1x Applicator, 2x Screws for sensor strip mounting, 1x 220V Wall power adapter for USB port power supply
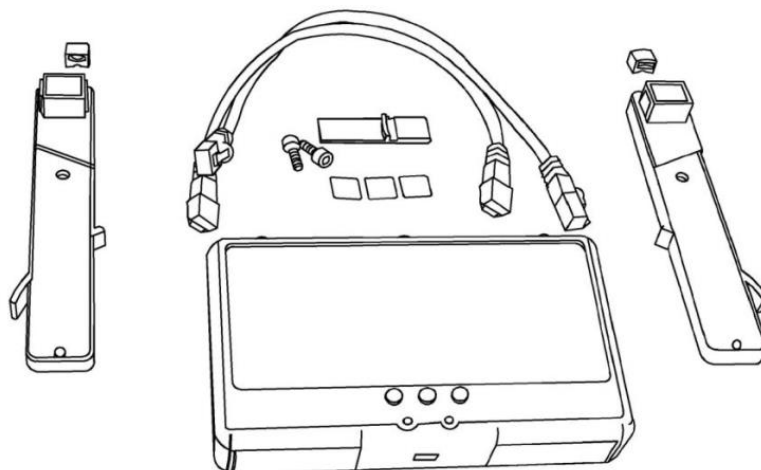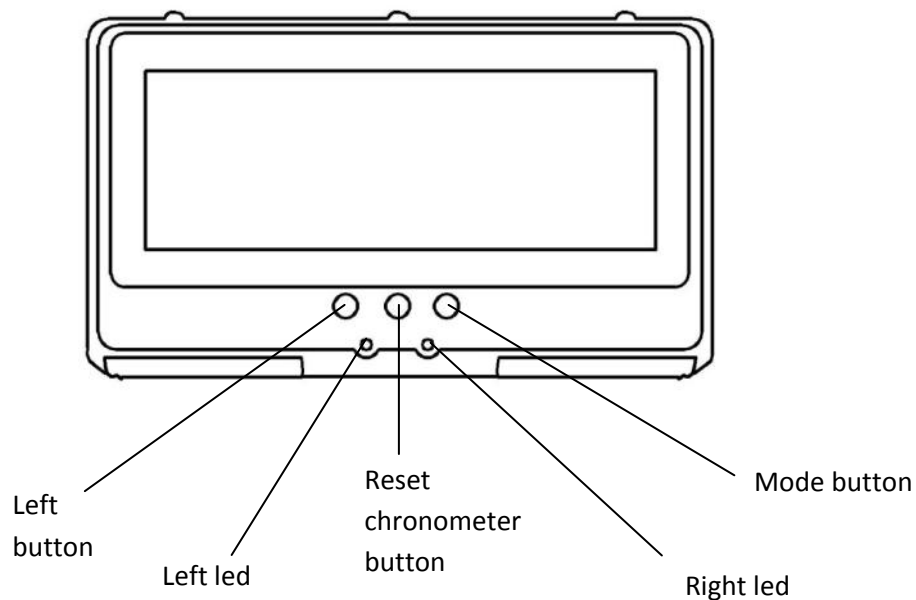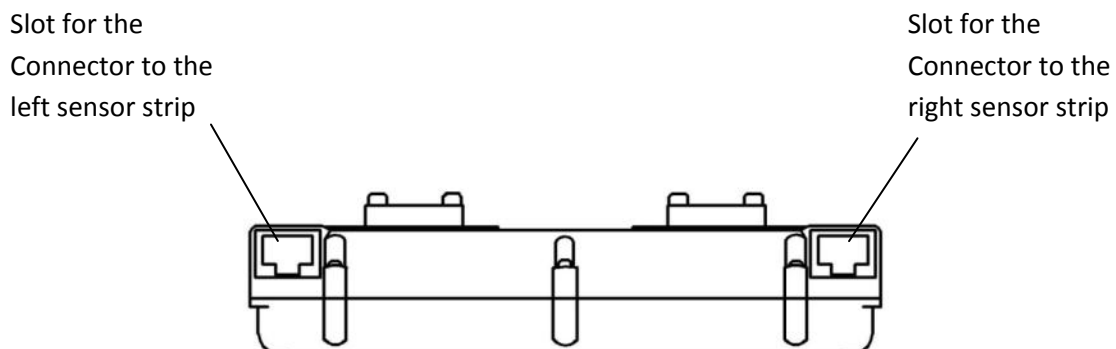
1.2 Central Unit Layout

The Ercolina computer is controlled with the 3 front buttons and a reset button located on the back of the unit.

There is no need for an on-off switch because the Ercolina Power Meter senses the presence or lack of training activity. If the Power Meter senses approximately 26 seconds of inactivity, it goes into a low power mode. After approximately 75 seconds of inactivity, the Power meter shuts down into a "sleep mode." The Power meter wakes up automatically when it senses that training activity has commenced.
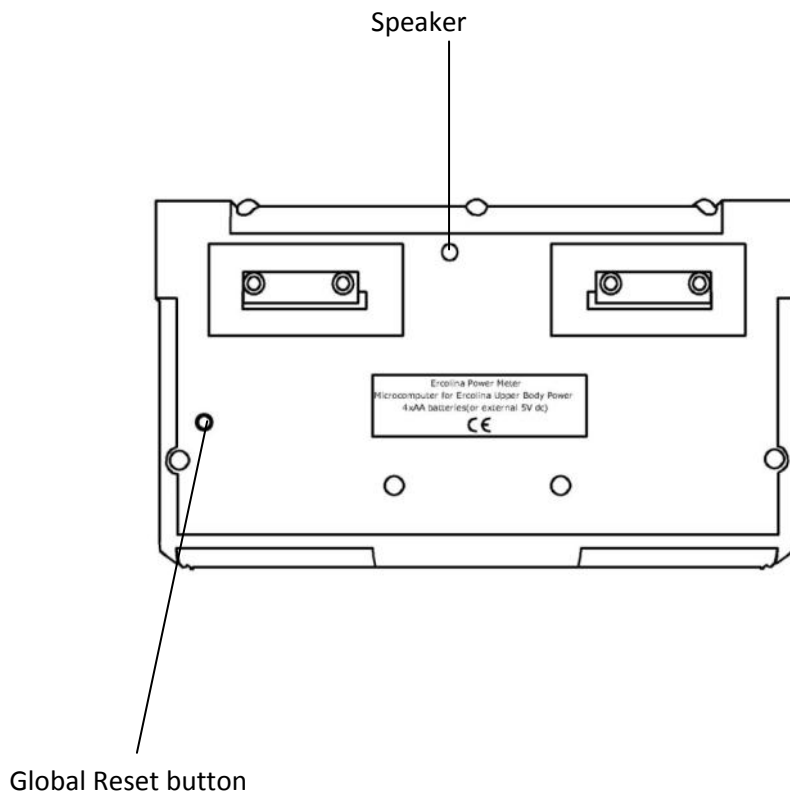
The function of the buttons at the time of the release v0.4 of the inner software is described in the following picture:

Reset chronometer button

Mode button

Left button

Left led

Right led

The Ercolina computer is connected to two sensor strips via two slots on the upper side:

Slot for the Connector to the left sensor strip

Slot for the Connector to the right sensor strip

On the back side of the Ercolina computer there is another button for the global reset.

Speaker

Ercolina Power Meter
Microcomputer for Ercolina Upper Body Power
4xAA batteries(or external 5V dc)
CE

Global Reset button

On the bottom side there are the two battery compartments Left and Right, and the USB port.

Battery
compartment Left

USB port

Battery
compartment Right
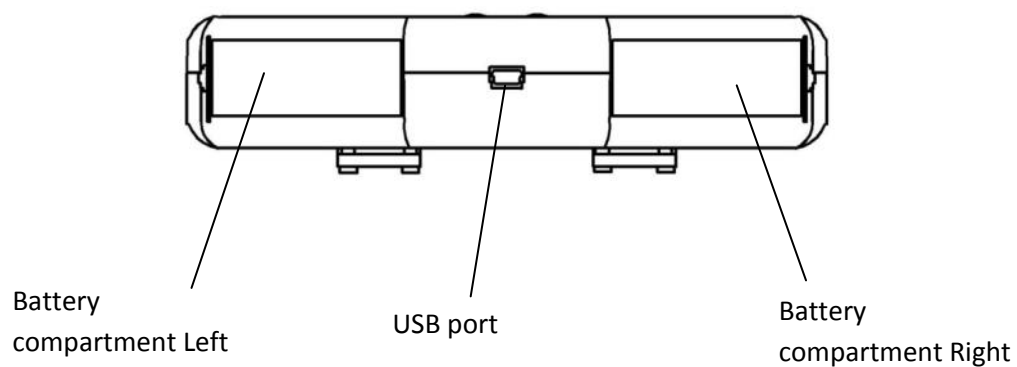
2. BATTERIES

2.1 Battery Type

The Ercolina computer has been designed for use with standard disposable alkaline batteries or rechargeable Nickel Metal Hydride (NiMH) batteries. No other battery types are recommended. Do not mix battery types.

2.2 Batteries replacement

When the average cells voltage is under1.0 V the low-battery signal appears on the welcome screen ("lo"), the Ercolina Power Meter changes screen brightness and other functions to "low power mode" giving a few extra hours of usage before the battery runs out completely.

To change the battery, open the two battery compartments by removing the left and right battery covers and fit 4 "AA" batteries. Take care to ensure they are fitted with the correct battery polarity. Replace the battery covers.

Training data are saved in the inner memory when the Ercolina Power Meter shuts down (sleep mode) automatically after 1 minute and 25 seconds of inactivity. To avoid data loss, wait until the Ercolina Power Meter enters sleep mode. Only then, change the batteries.

Please note that the connection of the external wall adapter to the Power Meter via the USB port **does not** charge the internal batteries. Connection of the wall adapter automatically switches the Power Meter from battery power to wall adapter power.

Always dispose of depleted batteries using approved disposal methods that protect the environment.

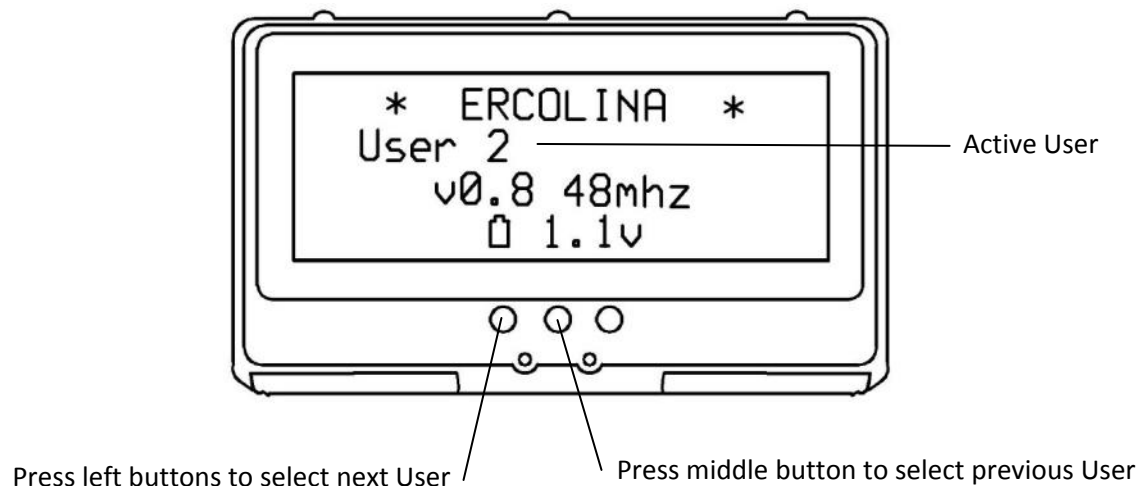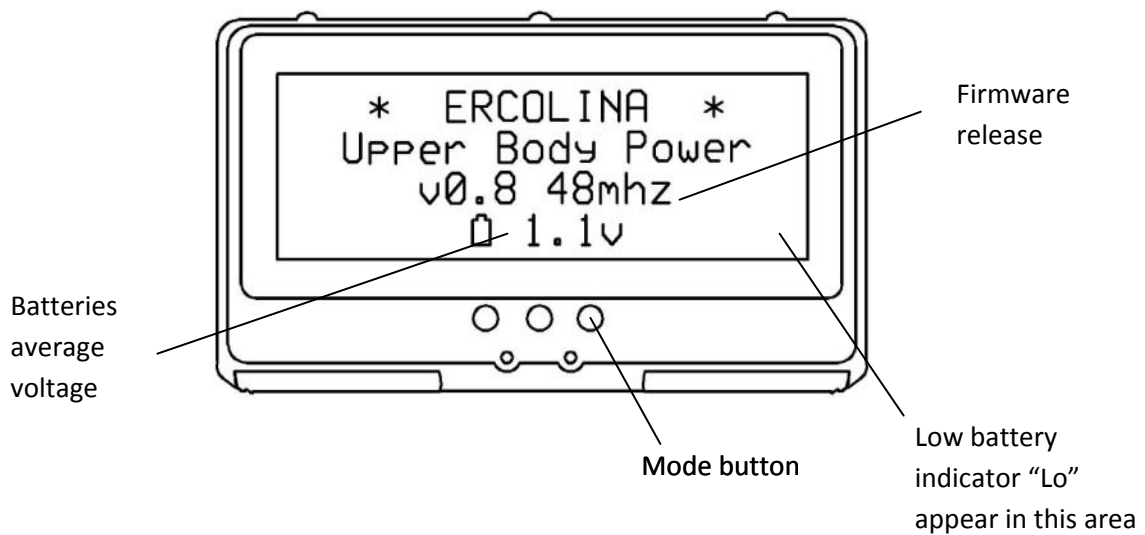**PLEASE REMOVE THE BATTERIES WHEN THE POWER METER IS NOT USED FOR EXTENDED PERIODS TO AVOID DAMAGE.**

Push for opening the batteries compartment
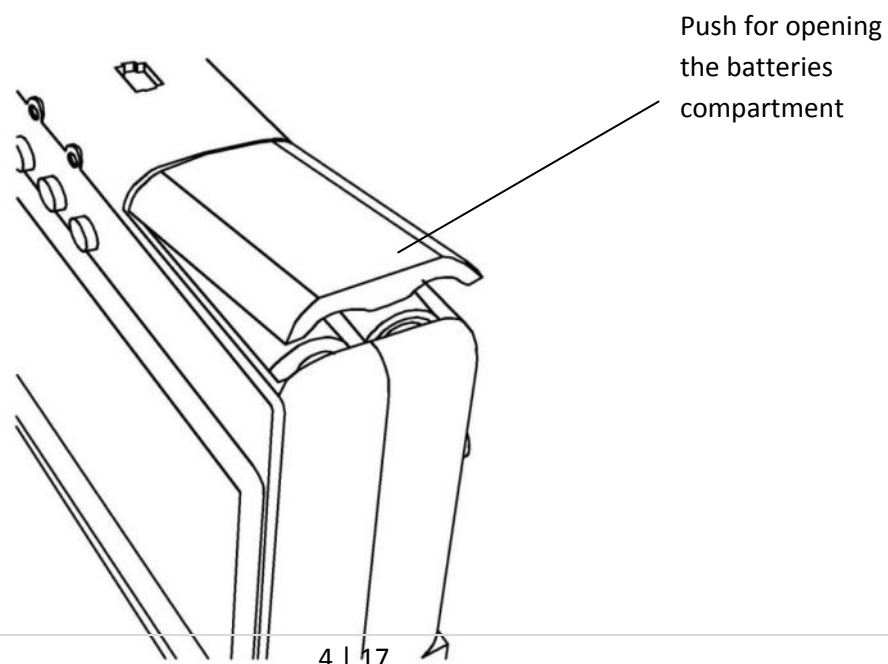
3. USING THE ERCOLINA POWER METER DISPLAY

The Ercolina Power Meter Display provides different screen modalities by pushing the <u>mode</u> button:

3.1 Welcome screen

On the welcome screen, the user can observe the release version of the Ercolina computer firmware, the voltage level of the battery cells or the presence of an USB cable connected with a 5V power supply or PC.

There can be a maximum of six users' settings and history in memory. The middle and left button can be pressed to select the Active user. The first username is "Upper body Power" by factory default setting. All names can be changed by the user.

Firmware release

Batteries average voltage

Mode button

Low battery indicator "Lo" appear in this area

Active User

Press left buttons to select next User

Press middle button to select previous User

3.2 Workout screen

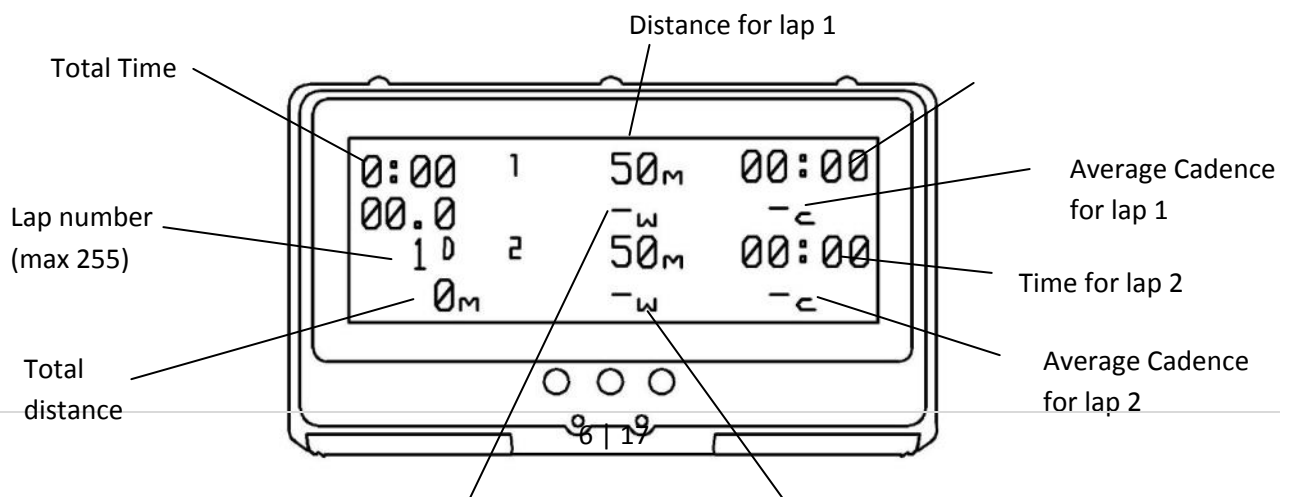On the workout screen, the user can observe the speed in km/h for each side of the Ercolina, the number of pushes for each arm, the length of the push (in percentage of the cord length in steps of 10%), the cadence, a chronometer and the covered distance.
In second row, this screen shows the difference between left and right arm.
In this screen the Ercolina Power Meter increase the time of the Chronometer and the distance only when the Ercolina is moving (i.e. training is taking place).

Left arm cadence [pushes/minute] Right arm cadence [pushes/minute] Difference in speed for left and right arm
Left arm pushes Right arm pushes
Left arm length of the push Right arm length of the push
Left arm Speed [km/h] Right arm Speed [km/h]
Chronometer HH:MM:SS.D Distance [meters]
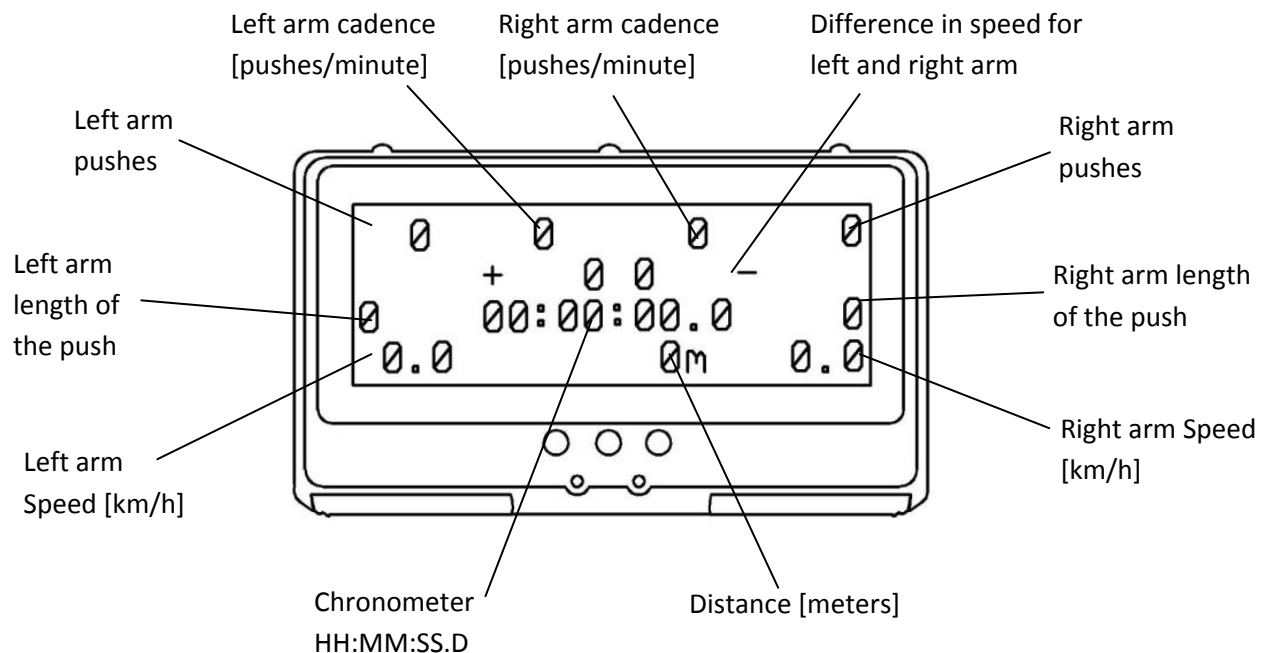
On this screen the middle button functions as a reset of the number of pushes, distance and chronometer. The pushes are counted if the length of the push exceeds two rounds of the cord drum.

3.3 Laps screen

On this screen the User can exercise using individual customized parameters. There can be two interval laps that repeat one after another continuously. Lap Distance modality or Lap Time modality can be selected. Distance laps can be adjusted from 50m up to 10000m. Time laps can be adjusted from a minimum of 10 seconds up to a maximum of 59 minutes and 50 seconds. Once the lap is started, the Power Meter calculates the average wattage for each lap and the average cadence for each lap.

Total Time Distance for lap 1
Lap number (max 255) Average Cadence for lap 1
Total distance Time for lap 2
Average Cadence for lap 2

Average Power for lap 1   Average Power for lap 2

In this screen, the left button acts like a start-stop button, the middle button acts like a reset lap control. The total time increases only if the start-stop button is pressed.

T= Time modality
D=Distance modality

Start Stop lap button   Reset lap button
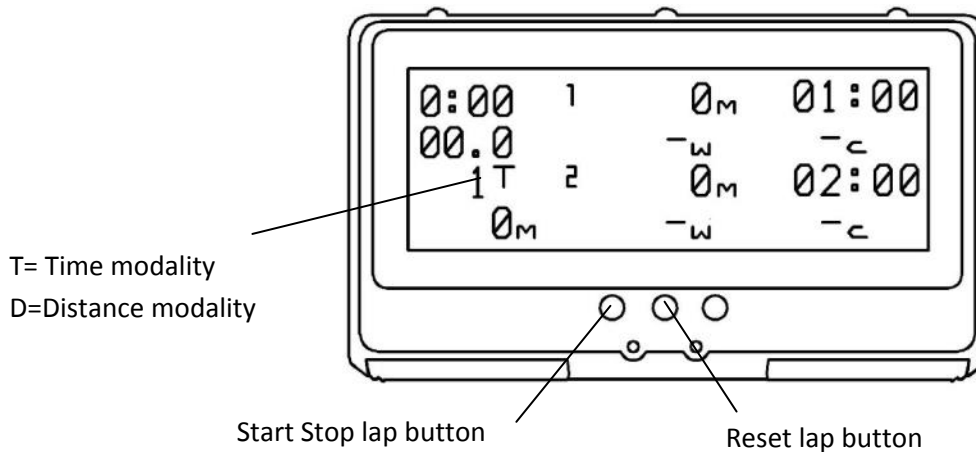
3.4 Graphic representation of the speed

On the Graphic speed screen, the user can observe if there are differences in speed between the left and right arms for push execution.
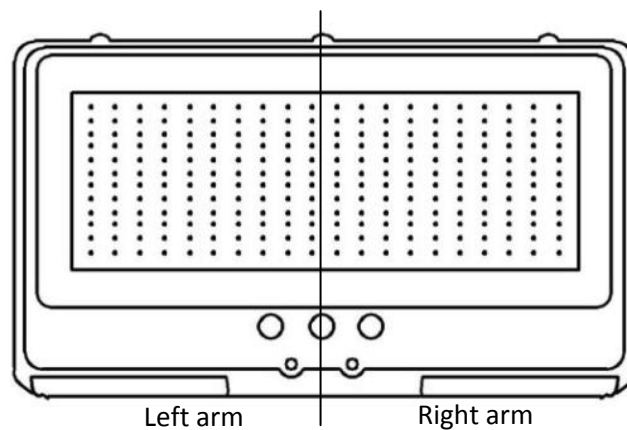
Left arm   Right arm

3.5 Graphic representation of the speed with value

On the Graphic speed screen, the user can observe if there are differences in speed between the left and right arms for push execution. In addition, the value of the speed is shown. (Note: the graph is less defined than the previous screen.)
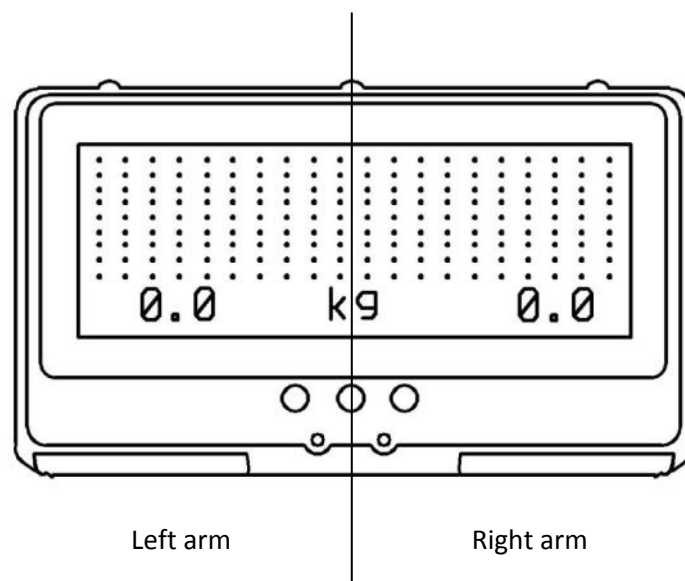
0.0   km/h   0.0
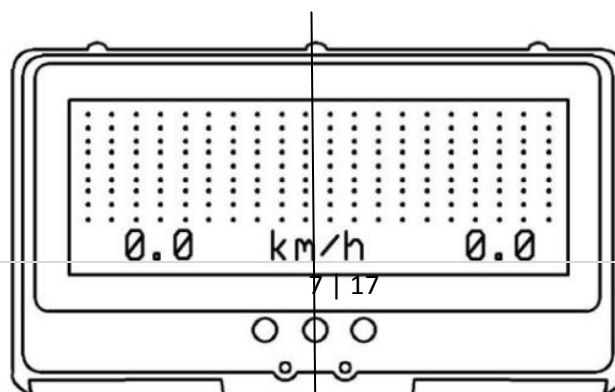
Left arm   Right arm

3.5 Average force calculation with graphic representation of the speed

On the average force calculation screen, the user can observe if there are differences in force between left and right arm for push execution. In addition, the speed of the execution is graphically represented. The force calculation is correct if the force is enough to keep the flywheel rotating for 2 rounds after the end of poling.
The average force is calculated for each push and the value is shown immediately after the push.

Left arm   Right arm

3.6 Average power calculation with graphic representation of the speed

On the average power calculation screen, the user can observe if there are differences in power between the left and right arms for push execution. Furthermore, the speed of the execution is graphically represented. The Power calculation is correct only if the force is enough to keep the flywheel rotating for 2 rounds after the end of poling.
The average power is calculated for each push, the value is shown immediately after the push
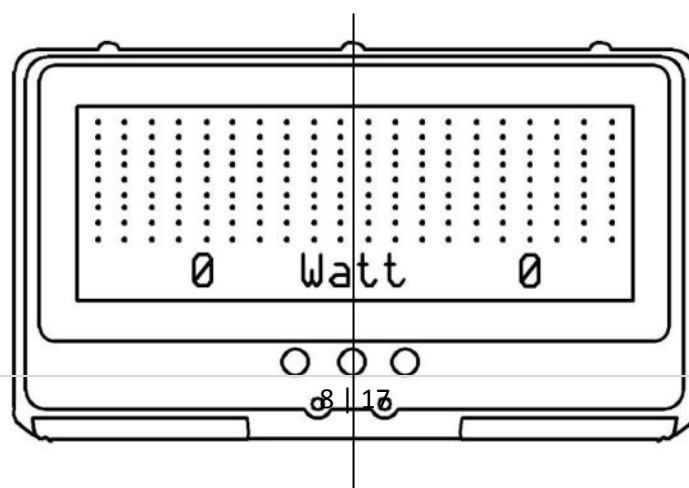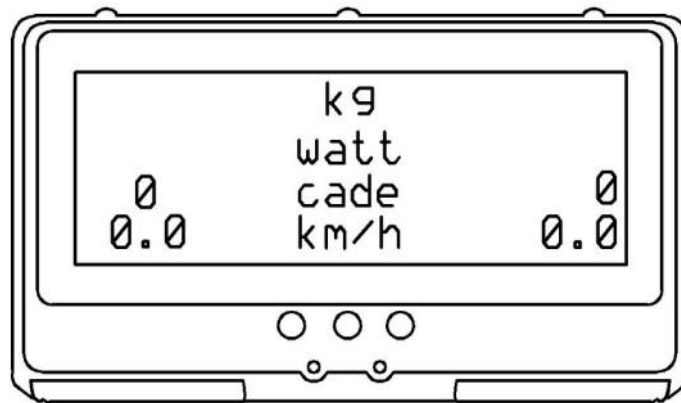
Left arm   Right arm

### 3.7 Simultaneous display of the force, power, cadence and speed

On this screen, the user can observe simultaneously the values of force (average for push) in kg, power (average for push) in watt, cadence (each push) in pushes/minute and instantaneous speed of the machine in km/hour. Refer to point 3.5 and point 3.6 for additional information.

3.8 Totals screen

On the totals screen the user can observe the total work done with the Ercolina. The reset button or the exhaustion of the battery has no effect on this data. The data is stored in the permanent (non-volatile) memory of the Ercolina computer, and consist of the following:

-Total pushes divided between left and right arm, up to 16.777.215 pushes

-Total distance up to 16.777.215 meters

-Total time up to 4660 hours 20 minutes 15 seconds

-Average speed calculated with total distance and total time ratio.

Total Left pushes   Total Right pushes

Total distance [m]

Total time [H:M:S]
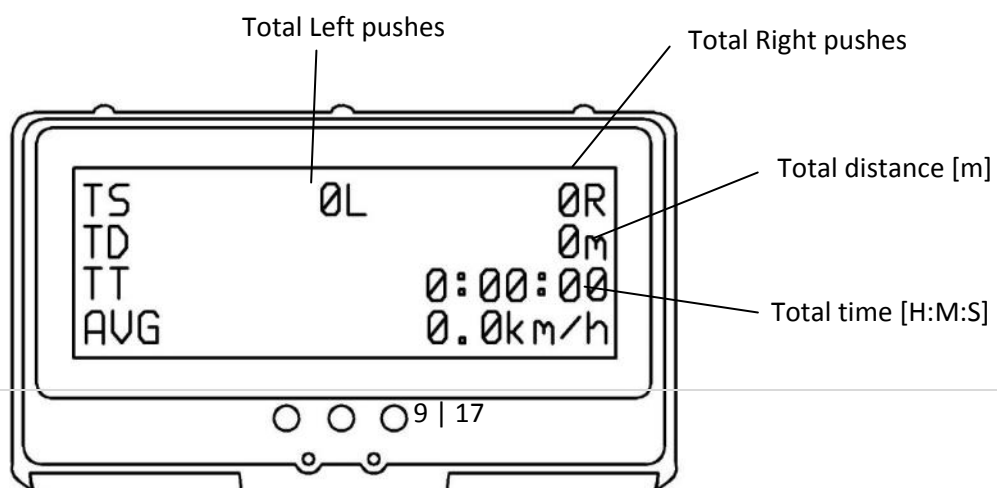
Average Speed [km/h]

4. SETTINGS

With this function, the user can modify the basic settings. The settings mode is accessible by pushing and holding the mode button for more than 3 seconds. In the settings mode there are nine screens. The user can pass from screen to screen pushing the mode button. The user exits and saves the settings by pushing and holding the Mode Button for more than 3 seconds.

4.1   Machine Type

With the left button, choose Standard or Doppia Forza (Double Strenght): the Doppia Forza machines have a supplementary flywheel for each shaft on both left and right sides. The Doppia Forza machine is designed for Elite skiers, offering different impact while pushing and different response to speed. It is designed to simulate the conditions encountered by very fast skiers. Having the Standard machine and choosing Doppia Forza in the Power Meter settings (and vice versa) will result in incorrect computation of force and power. Be sure to select the machine you have.

```
1/9 Set machine type

* Standard
  Doppia Forza
```

Mode button

Change selected buttons
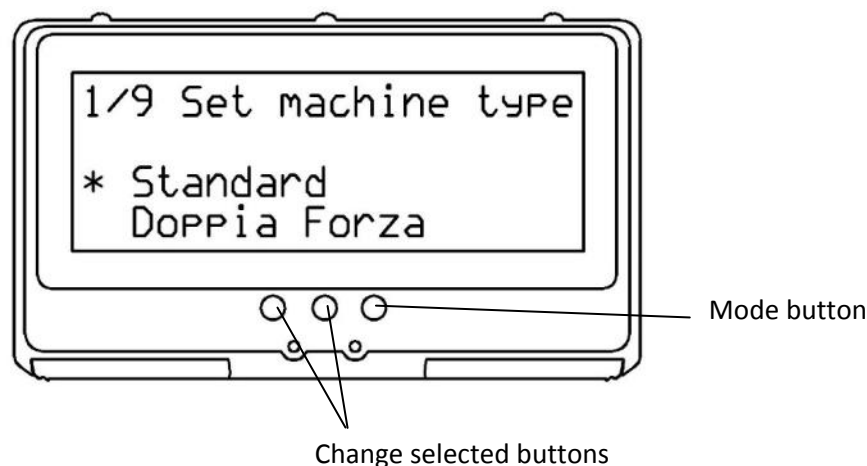
4.2   Delete History

This option allows the user to delete the totals. Selecting "yes" with the left or middle button, the Totals are deleted. To exit the settings mode, push and hold the right button for more than 3 seconds.

```
2/9 Set history zero

* no
  yes
```
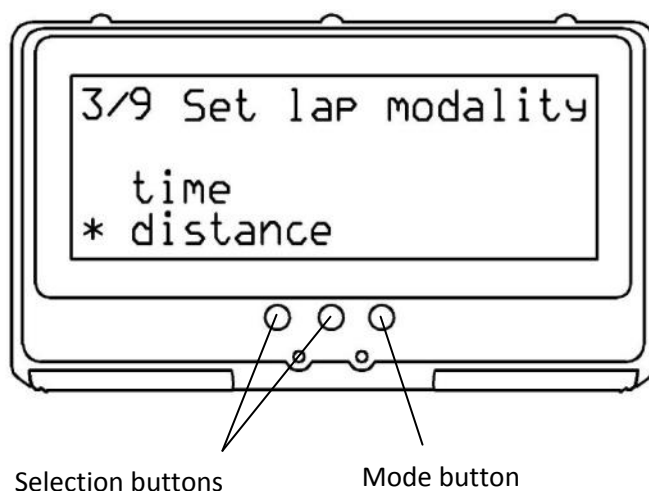
Mode button

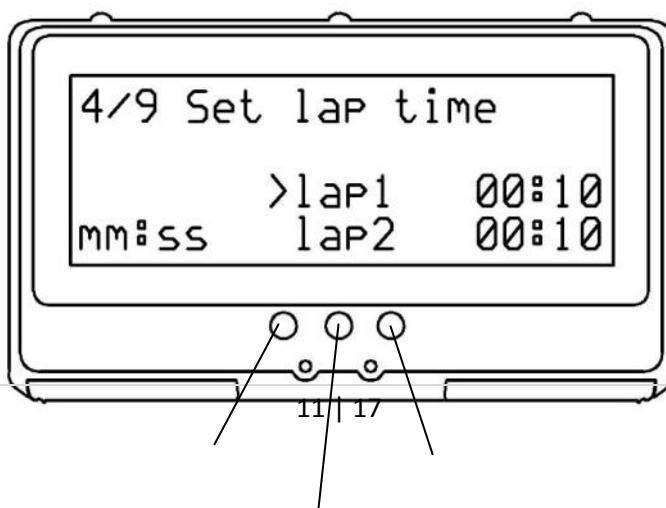Change selected buttons
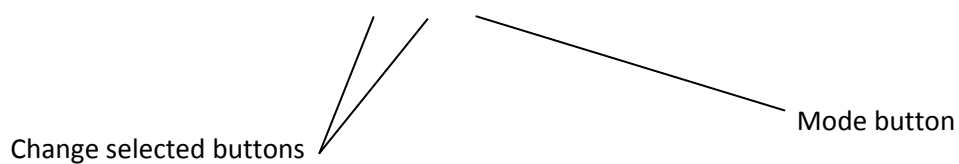
4.3 Modality Lap

In this screen the user can pre-select and edit an intervals workout, choosing between time and distance modality.

To choose one of them, press the left or central button and to move to the next screen, press the mode button.

```
3/9 Set lap modality

   time
 * distance
```

Selection buttons   Mode button

4.4 Lap Time or Lap Distance

If in the previous screen the user has selected "Time", he will find this screen. Here, the user changes the time duration of the workout. To select the lap, press the Mode Button. To add or remove seconds/minutes, press respectively the left and the middle button. Value of Time interval lap can be from a minimum of 10 seconds to a maximum of 59 minutes and 50 seconds in 10 second increments.

```
4/9 Set lap time

          >lap1    00:10
mm:ss      lap2    00:10
```
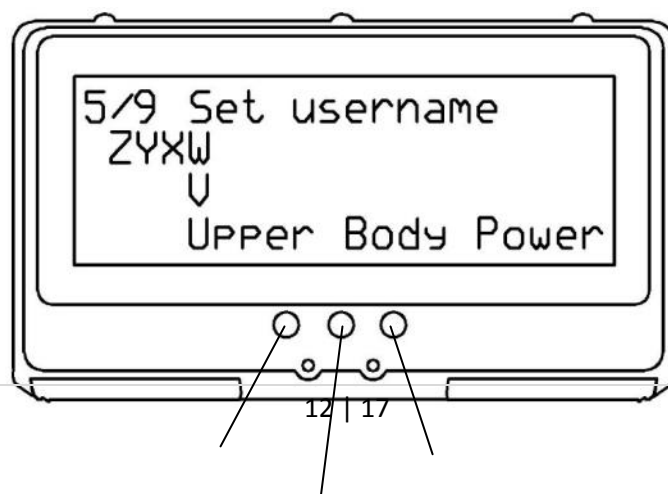
Increase button   Mode button

Decrease button

If in the previous 3/9 screen the user has selected "Distance", he will find this screen. Here, the user can change the length (distance) of the intervals workout. To select the next lap, press the Mode Button. To add or remove meters, press respectively the left and the middle button. Values of distance interval lap can be from a minimum of 50 meters to a maximum of 10.000 meters in 50 meter increments.

```
4/9 Set lap distance

              >lap1      50
meters         lap2      50
```

Increase button   Mode button

Decrease button
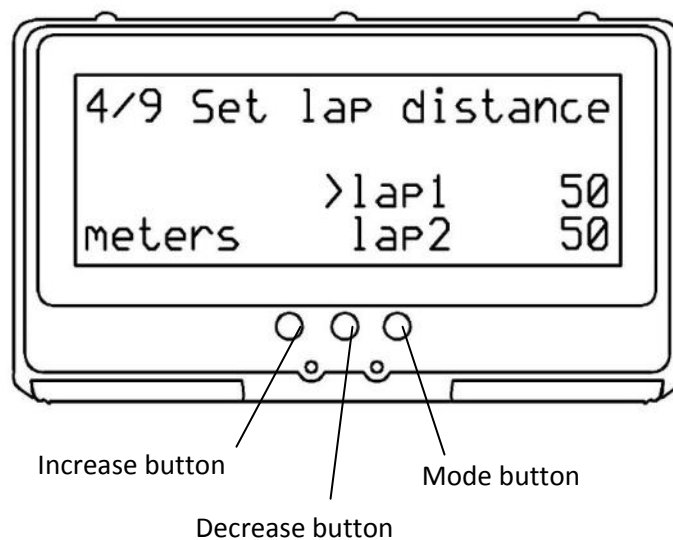
4.5   *Username*

In this screen the user can insert his name or a description of the training, under which he can save data or different types of training. Press the middle button to select the letter to insert / change. Then press the left button to scroll through the characters (numbers, spaces, uppercase and lowercase letters). The maximum number of characters permitted in a username is 16.

```
5/9 Set username
ZYXW
   V
Upper Body Power
```

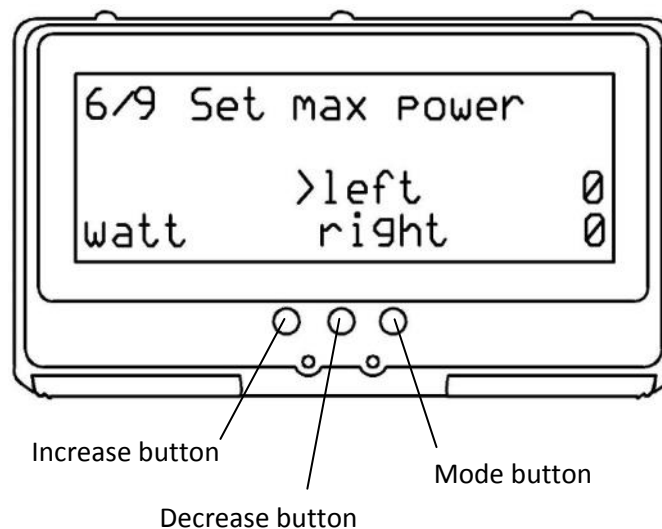Select characters button   Mode button

Next character button

4.6   Max Power

In this screen the user can change the maximum power for the left arm and the right arm. Every time the power generated from each arm exceeds the user specified limit for that particular arm, the corresponding right or left led illuminates.

To select the arm, press the Mode Button. To increase or decrease power limit, press respectively the left or the middle button. Set power to zero if you wish to deactivate the Power Limit signal light.

This function is particularly useful for cases where the Upper Body Power machine is used as part of therapy for recovering from an injury or an overstress situation. The indicated wattage and the limit light can be used to avoid damage to muscles in this situation.

```
6/9 Set max power

             >left         0
watt          right        0
```

Increase button

Decrease button   Mode button

4.7   User Weight

In the next screen, the user can insert his weight (kg) for an accurate calculation of the training results. To add kilos, press the left button, to remove kilos, press the middle button. This function is unused in 0.8 version.

```
7/9 Set user weight


kgs  78
```

13 17

Increase button

Mode button

Decrease button
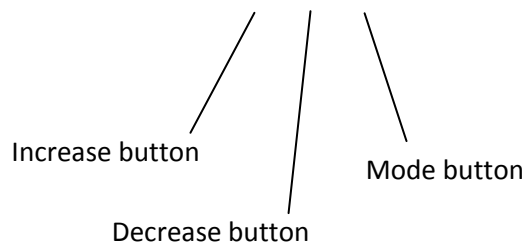
4.8 Alarm

Allow the user to enable or disable the Lap sound alarm that sounds at the end of each lap.

```
8/9 Set lap alarm

* On
  Off
```

Change selected buttons

Mode button
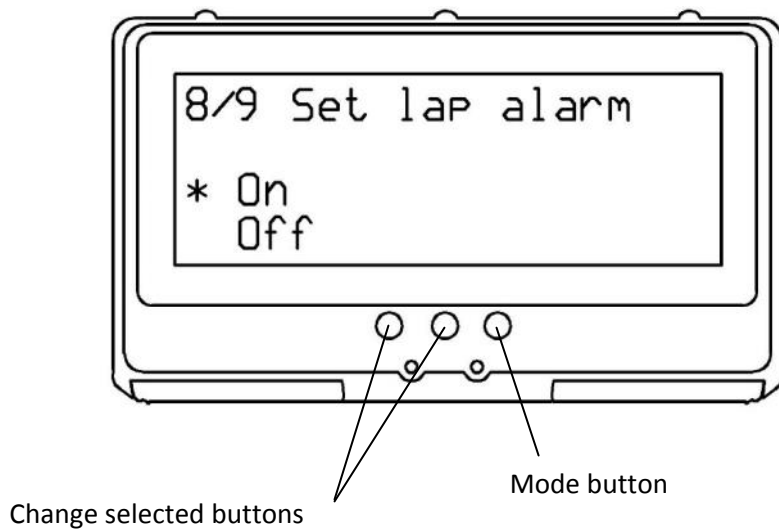
4.9 Restore default data

This function restores factory default settings and reset history for the current user. Selecting "on" with the left or middle button, the Totals are deleted and Username, Machine type, Lap modality, Lap Time, Lap distance, Power Limit are restored to default data. To exit the settings mode, push and hold the right button for more than 3 seconds.

```
9/9 Set default data

* On
  Off
```

Mode button
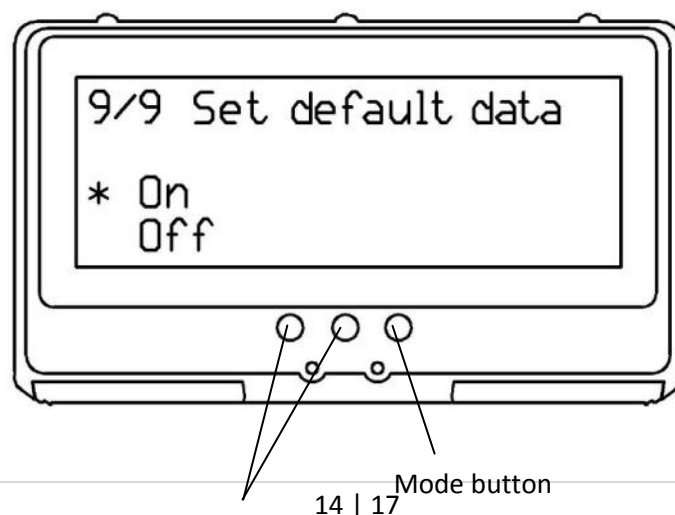
Change selected buttons

5.   CONNECTION WITH USB PORT

5.1   Connection to a power supply with usb port

The Ercolina Power Meter Display is supplied with
a 5V DC wall adapter equipped with mini USB
connector for attaching to the Ercolina Power
Meter. See the picture to the right.
**Please connect or disconnect the wall adapter
from 220Volt AC supply only when detached
from the Ercolina Power Meter**. Connect the USB
connector to the Power Meter only after plugging
in the wall adapter. Disconnect the Ercolina
power meter USB connector before unplugging
the wall adapter.
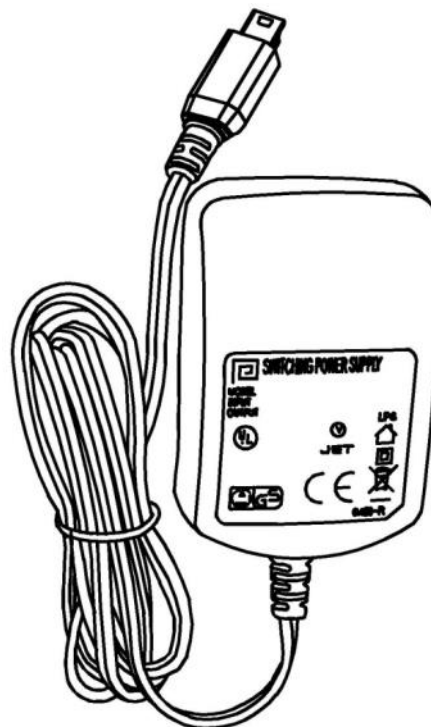
5.2 Upgrading the Firmware

The Ercolina Power Meter Display software is in constant evolution. The number of
screens here described is based on V0.8 of the firmware. More screens and functions will
be added/modified and the user is advised to keep the Ercolina computer updated as new
firmware versions become available. (This manual will be updated accordingly.)

On the web site www.upperbodypower.com, upgrades are available under the Power
Meter product page in the site shop.
There are two files. One file is the software to install on the computer, for permitting the
USB connection with the Ercolina Power Meter and the subsequent loading of new
firmware.
This file it is called: "***Powerup .exe***"
The other file is the version of the firmware available to update the Ercolina Power Meter.
It is called: "***epm_code_vx.x.hex***" where x.x is the firmware version.

The connection/loader software at the moment is only available for Windows XP, 7 and 8.
The following steps are necessary to upgrade the Ercolina Power Meter to the newest
version of the software.

STEP 1
Download the two files from the web site

STEP 2
Click on the Powerup.exe and unzip the program files in a folder on your PC

STEP 3
Dismount the Central Unit of the Power Meter from the Ercolina Upper Body Power
machine and then connect it to your PC with a mini USB cable

STEP 4

On the Ercolina Power Meter, press and hold simultaneously for at least 10 seconds the two buttons "global reset"+"mode"

## STEP 5

Release the button "global reset" while keeping pressed the "mode" button for another second

STEP 6

Release the "mode" button. At this point, the Ercolina Power Meter enters PC connection mode and is ready for the update. The right led should be on

STEP 7

Start the program "powerup.exe". This program senses the connection with the Ercolina computer and shows the message "Ercolina Power Meter connected". If the connection is not successful, it remains "disconnected" repeat the steps from STEP 4 until it shows the connected message. Click on "Update".
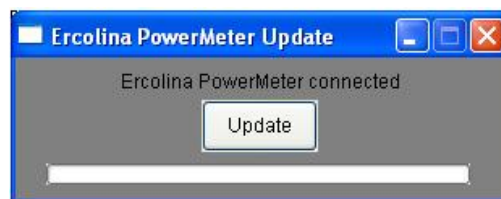
STEP 8

Select the "*hex*" file downloaded from the web site and then click on "Open"
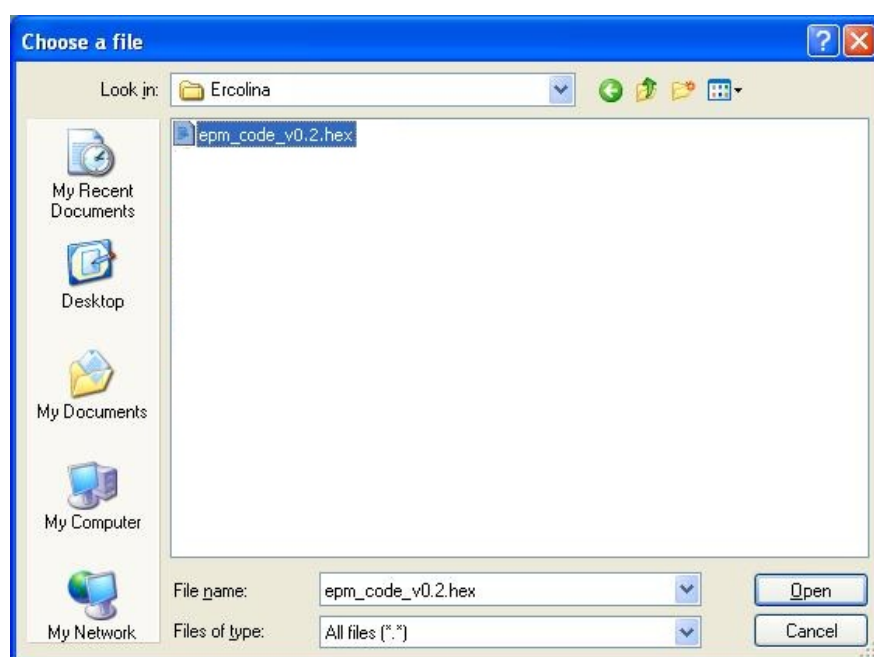
STEP 9

The update process is indicated by the progress bar. The progress bar will go through two cycles: one for the writing process and one for the verifying process. **In this state, do not disconnect the USB cable from the Ercolina Power Meter. To do so risks damage to the power meter.**

STEP 10

When the process ends successfully, the Ercolina Power Meter will restart from the welcome screen.
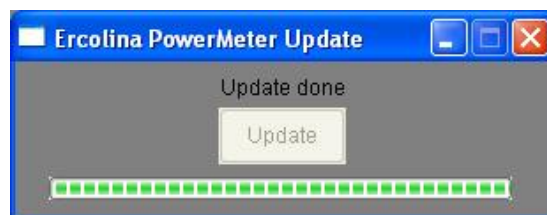
STEP 11

Only then, disconnect the USB cable and mount the Ercolina Power Meter back on the Ercolina Upper Body Power machine.