ERCOLINA POWER METER DISPLAY

DISPLAY FOR ERCOLINA UPPER BODY POWER

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1. **ERCOLINA POWER METER OVERVIEW**

   The Ercolina Power Meter analyze the performances of athletes on the Ercolina Upper Body Power: it measure of the speed of the Ercolina sides FOR EACH SINGLE ARM, and dedicated software execute the calculations to provide instantaneous speed (km/h, left and right value), distance (meters, average of the two arms), instantaneous cadence for each push (push/minute, left and right value), average force for each push (in kgs, left and right value) and average power for each push (in watts, left and right value).

   The Ercolina Power Meter give all these measures for both double poling and diagonal technique. The internal memory keeps the total for number of pushes, covered distance and average speed also when the Ercolina computer is turned off or without power supply. The Ercolina Power Meter weight 500 grams, and it is easy to carry together with the Ercolina Upper Body Power: it is powered from normal 4xAA batteries, that can endure for up to 10 hours of training outdoor : for fixed installation there is the included 220v AC/DC 5V adapter.

   It can be upgraded easily, thanks to the USB connection with a PC and a dedicated software. We will release upgrades periodically , adding new screens and functions. Special screens can be supplied "ad personam" for particular needs.

   The Ercolina Power Meter can be ordered already installed on a new Ercolina, but it can be easily installed on all Ercolina Upper Body Power machines produced (magnetic models) since 2007 onward. The installation on existing machines take approximately 15 minutes.

1.1 *Components*

   The Ercolina computer is provided with the following parts:

   1 Central Unit, 2 Sensors strips, 3 Adhesive square tapes, 2 Magnets, 2 Cables for connection, 1 Applicator, 2 Screws for sensors strips mounting, 1 Wall cube for USB port power supply
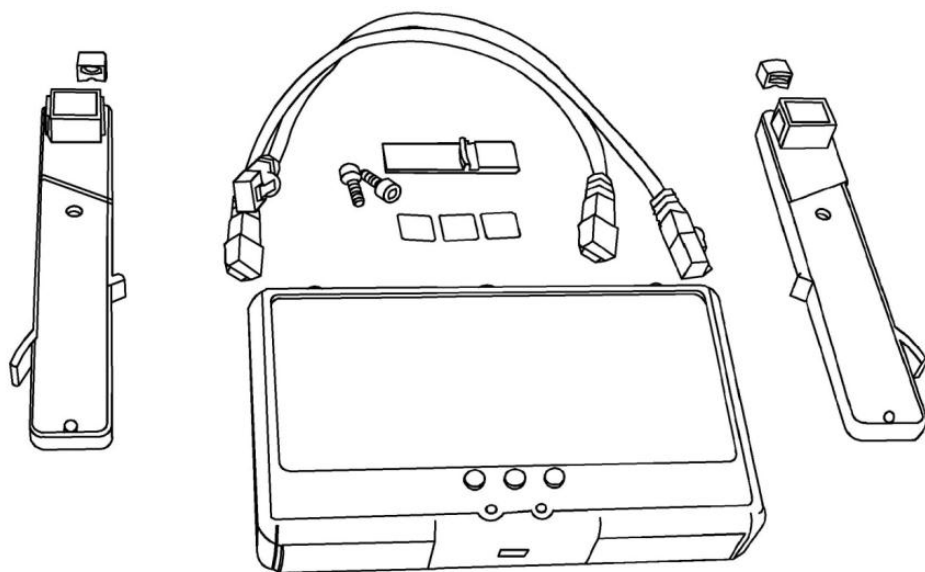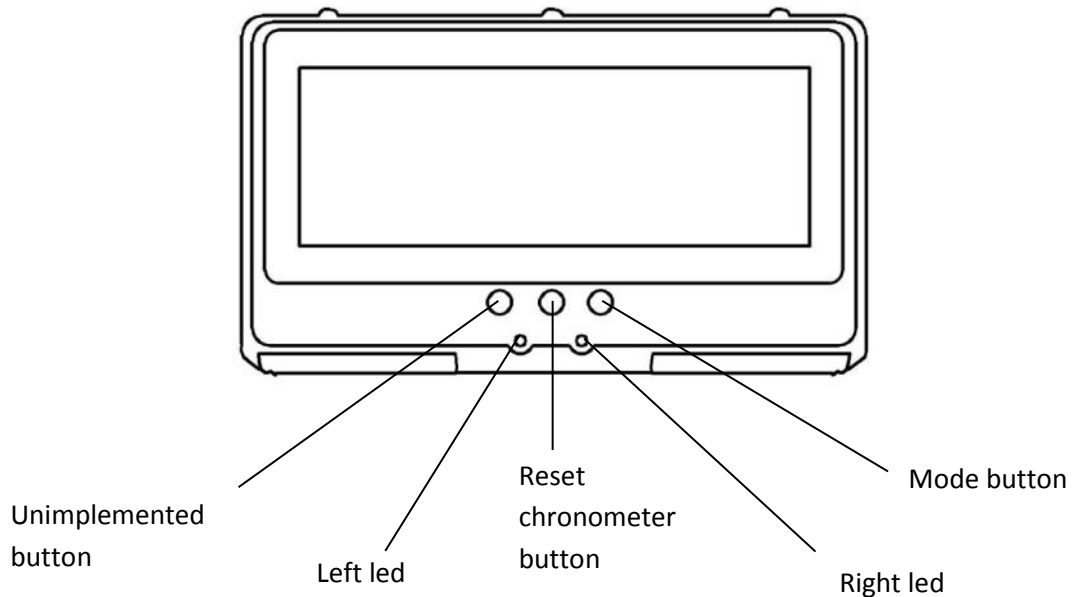
1.2 Central Unit Layout

The Ercolina computer is controlled with the 3 frontal buttons and a backside reset button.

There is not on/off button because the Ercolina computer can sense the functioning of the Ercolina Upper Body Power and automatically turn on if movement is detected.

The Ercolina computer turns automatically in low consumption mode if the Ercolina is not used for about 26 seconds.

If the Ercolina Upper Body Power is not used for about 1 minute and 15 seconds, the Ercolina computer turns automatically off.
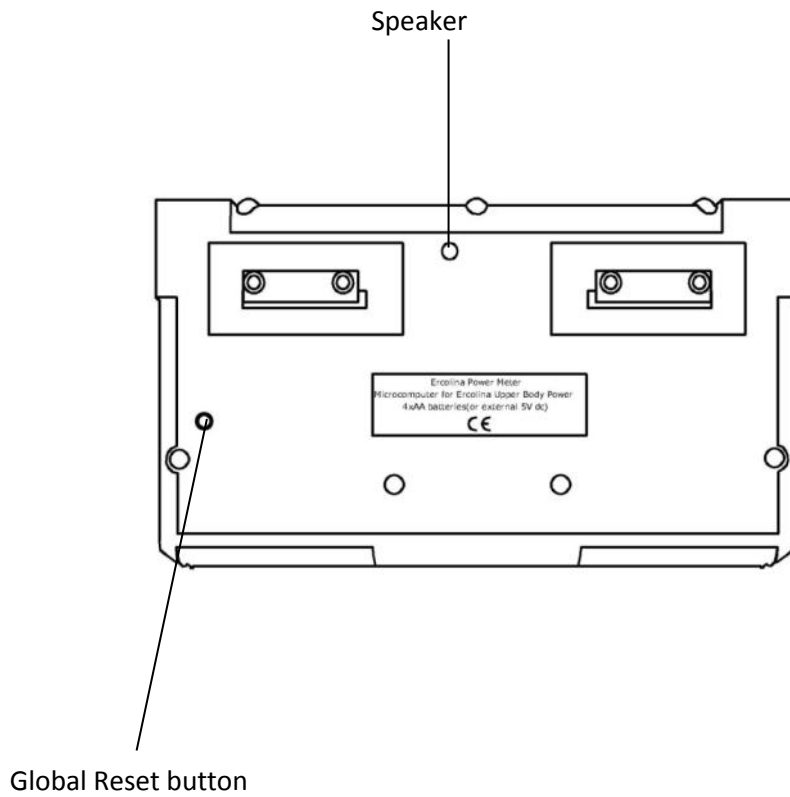
The function of the buttons at the time of the release v0.4 of the inner software is described in the following picture:

Reset
chronometer
button

Mode button

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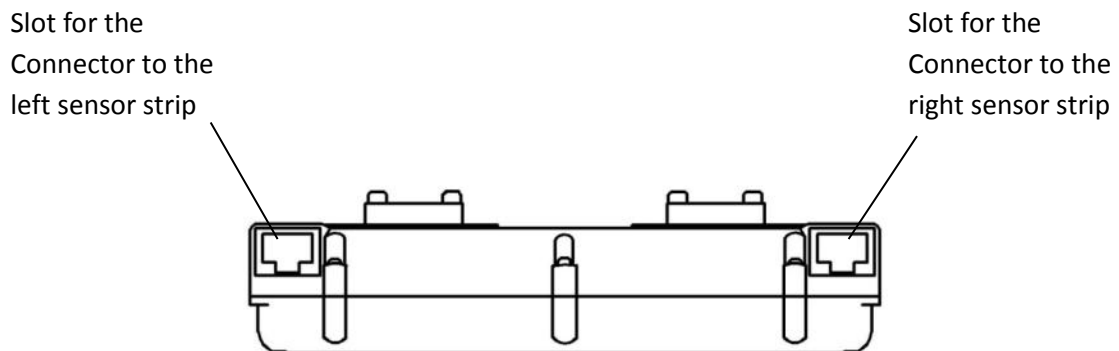
On the back side of the Ercolina computer there is another button for the global reset.

Speaker

Ercolina Power Meter
Microcomputer for Ercolina Upper Body Power
4 xAA 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
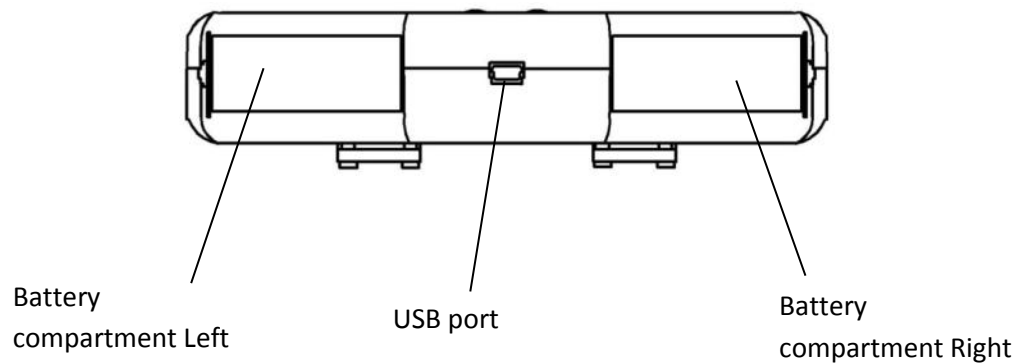
2.   BATTERIES

2.1 Battery Type

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

2.2 Batteries replacement

When the average cells voltage is under 1.0 V the signal of low battery appear on the welcome screen ("lo"), the Ercolina Power Meter change brightness and other functions to "low power mode" giving a few extra hours of usage before the battery run out completely.

To change the battery , open the two batteries compartments by removing the battery covers, left and right, 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 shut down (sleep mode) automatically after 1 minute and 15 seconds of inactivity, to avoid data loss wait that the Ercolina Power Meter enter sleep mode, and then change the batteries.

The Ercolina computer can function also with only 2 "AA" batteries.

The battery charger is not included. Connecting a 5V power supply via the USB port the Ercolina computer use the USB power supply and the batteries are automatically disconnected from the circuit.

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

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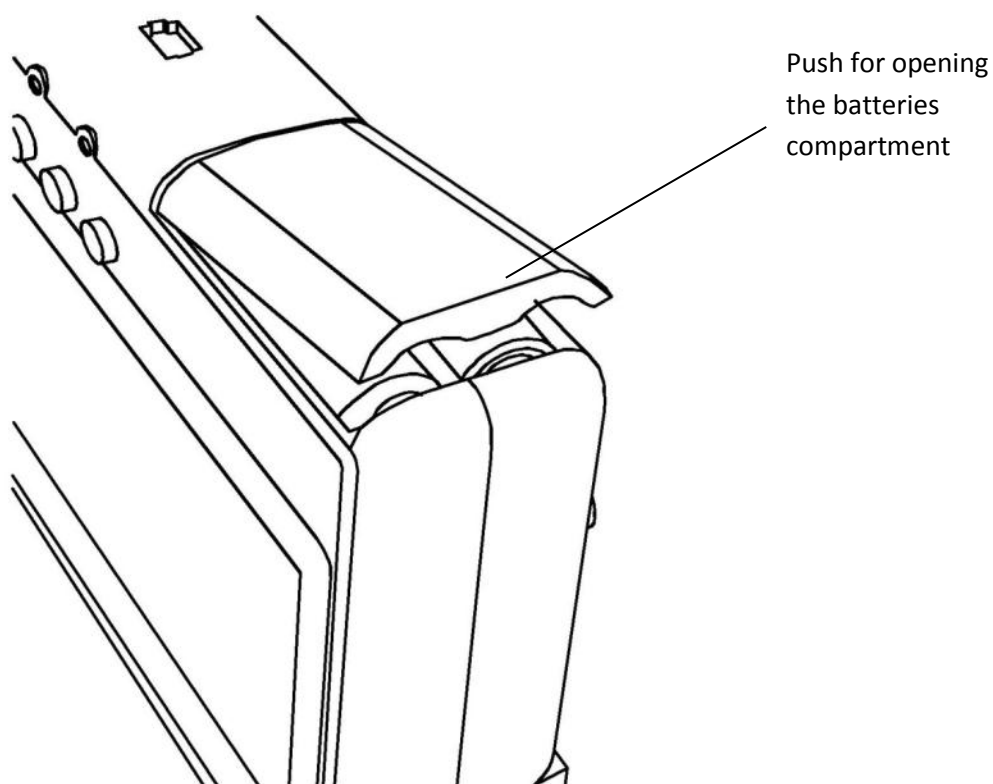
3   USING THE ERCOLINA POWER METER DISPLAY

The Ercolina Power Meter Display, provide different screens modalities by pushing the mode button:
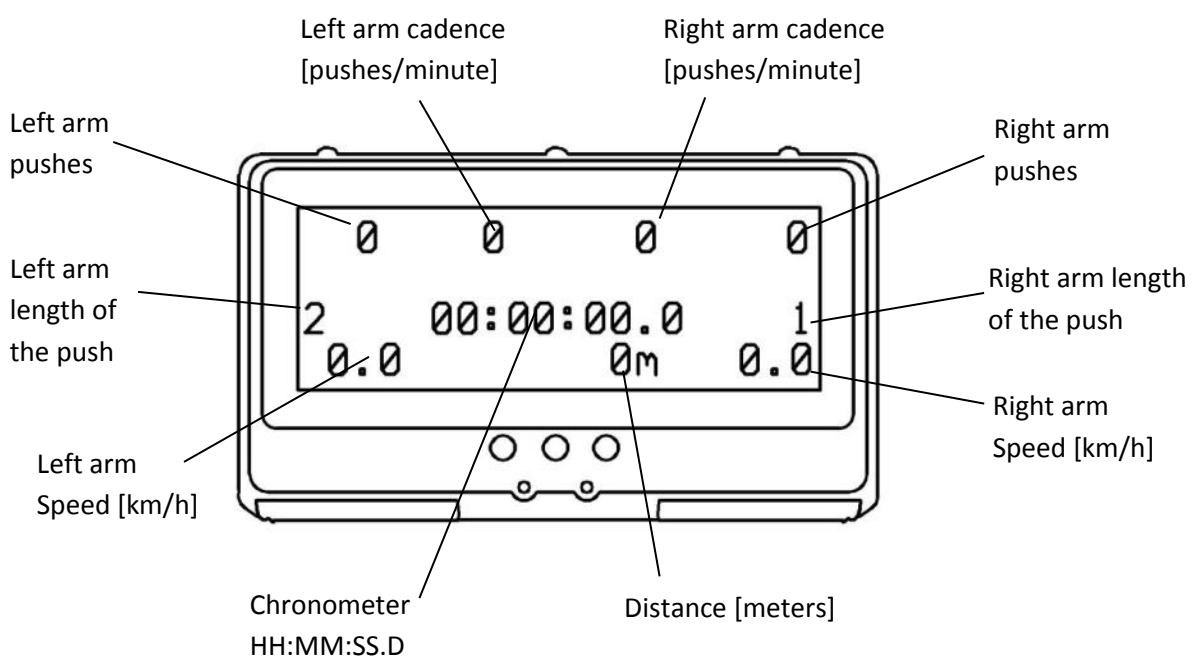
3.2 Welcome screen

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

Batteries average voltage

Firmware release

Low battery indicator "Lo" appear in this area
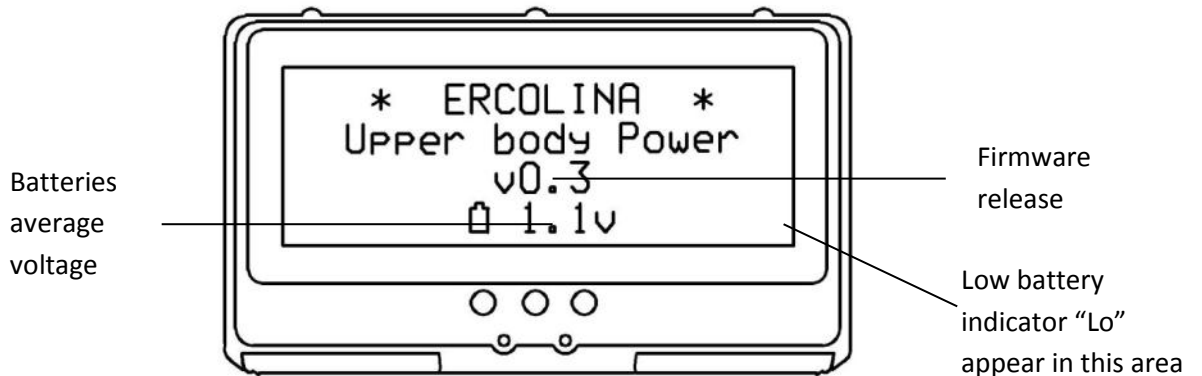
3.3 Workout screen

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 rounds of the cord drum), the cadence, a chronometer and the covered distance.
The Ercolina computer increase the time and the distance only when the Ercolina is moving.

Left arm cadence [pushes/minute]

Right arm cadence [pushes/minute]

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 function as a reset of the number of pushes, distance and chronometer.

The pushes are counted if the length of the push is over 2 rounds of the cord drum.

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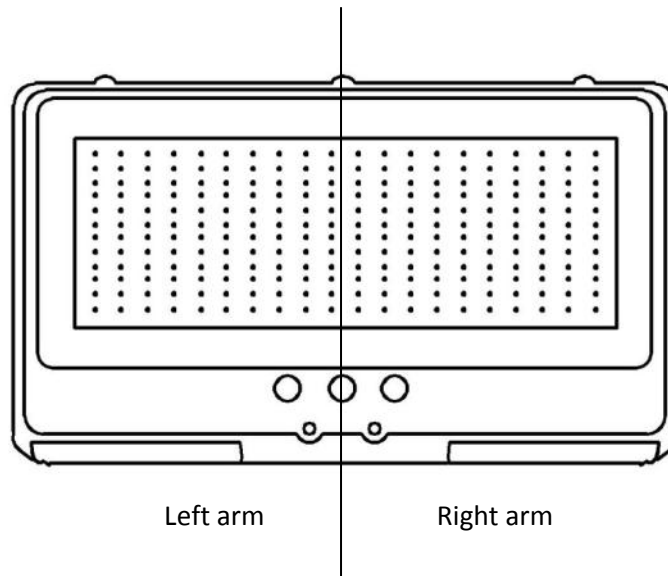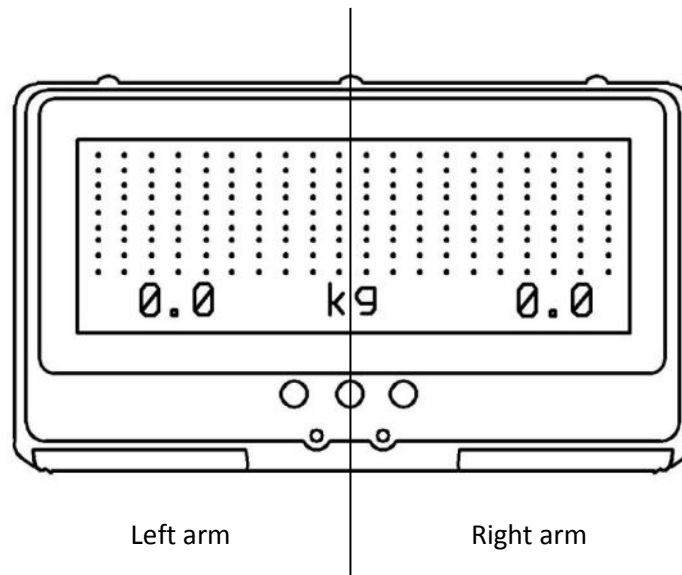
Left arm   Right arm

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 left and right arm for push execution , in addiction the value of the speed is shown (the graph is less defined than the previous screen).
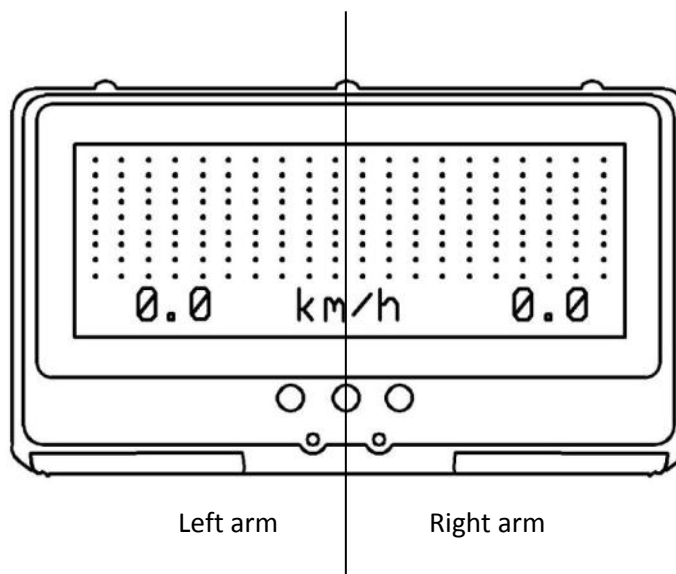
Left arm   Right arm

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 addiction the speed of the execution is graphically represented. The Force calculation is correct while the force is enough to keep the flywheel rotating for 2 rounds after the end of the poling.
The average force is calculated for each push and the value is showed 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 left and right arm for push execution, in addiction the speed of the execution is graphically represented. The Power calculation is correct while the force is enough to keep the flywheel rotating for 2 rounds after the end of the poling.
The average power is calculated for each push, the value is showed immediately after the push

Left arm   Right arm
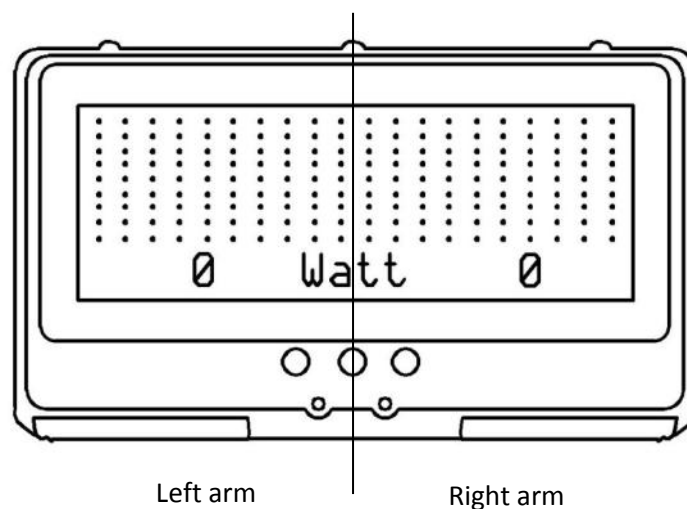
### 3.7 Representation of the force, power, cadence and speed together

On this screen the user can observe 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, all together: refer to point 3.5 and point 3.6 for additional information's.
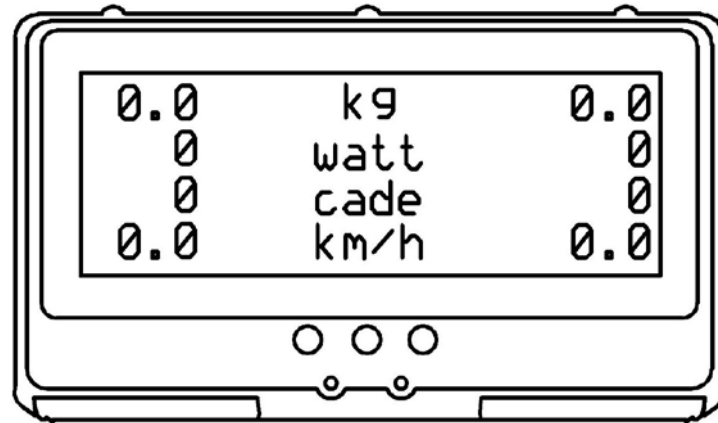
3.8 Totals screen

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, the data are stored in the permanent memory of the Ercolina computer, and are 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.
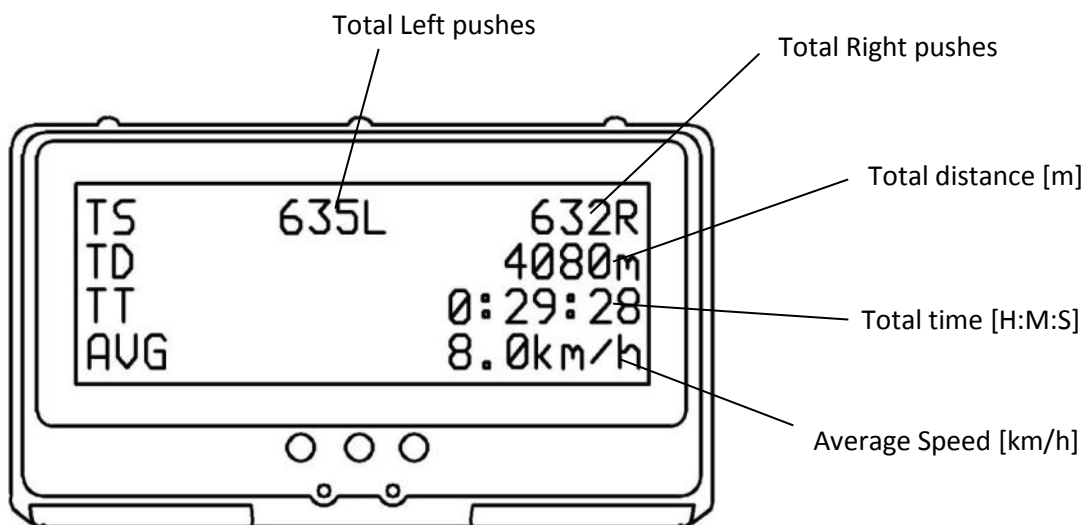
4 **CONNECTION WITH USB PORT**

4.1 Connection to a power supply with usb port

The Ercolina Power Meter Display is supplied
with a wall cube 5V DC with mini USB connector
See the picture aside.

4.2 Upgrading the Firmware

The Ercolina Power Meter Display is still in its
infancy. The software of the microcontroller is
in evolution, the number of screens here
described is based on the V0.4 of the firmware,
more screens and functions will be added and
the user can keep the Ercolina computer
updated.
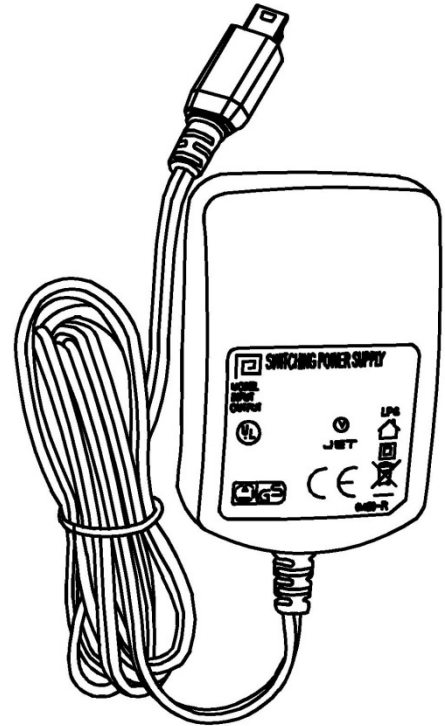
On the web site www.upperbodypower.com is available under the Downloads menu,
the Folder dedicated to the Ercolina Power Meter.
There are two files; one file is the Software to install on the computer to connect with
the Ercolina.
It is called: "*epm_code_vx.x.hex*"
The other file is the version of the Firmware available to update the Ercolina Power
Meter.
The file it is called: "*Powerup for Windos XP.zip*"

The upgrade software at the moment is only available for Windows Vista, XP, 2000, NT,
98; other Operative Systems will be supported soon.
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 zip file and then Install the program Powerup.exe on your PC

STEP 3
Dismount the Ercolina Power Meter from the Ercolina and then connect it to your PC
with a mini USB cable (not included)

STEP 4
On the Ercolina Power Meter, press simultaneously, the two buttons "global
reset"+"mode"

STEP 5
Release the button "global reset" while keeping pressed the "mode" button

STEP 6
Release the "mode" button, at this point the Ercolina Power Meter enter the connection modality and it is ready for the Update, the right led should be on

STEP 7
Start the program "powerup.exe", this program sense the connection with the Ercolina computer and it shows the message "Ercolina Power Meter connected", if the connection is not successful, and it remains "disconnect" repeat 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"
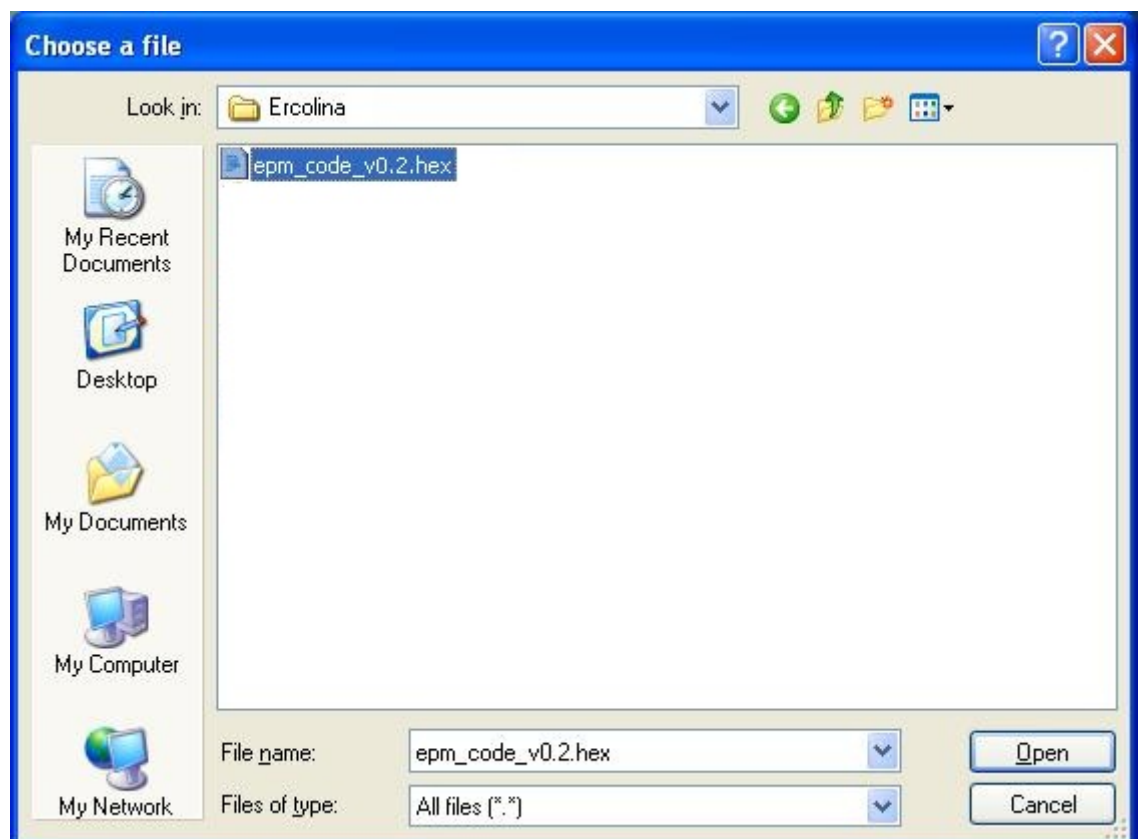
STEP 9

The update process is indicated by the progressing bar, the progress bar will go two times one for writing process and one for verifying process; in this state avoid disconnecting the USB cable from the Ercolina Power Meter.

STEP 10

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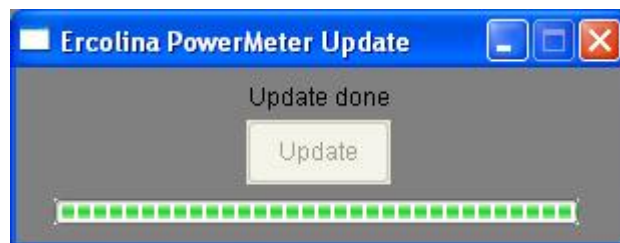
STEP 11

Disconnect the USB cable and mount the Ercolina Power Meter on the Ercolina.