Operating Instructions ergomo® pro

Please read the operating instructions carefully before using the *ergomo® pro* system.
Use of the system requires you to have understood and complied with the operating instructions.

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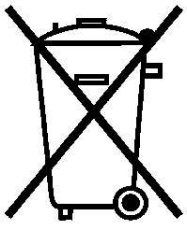
1. General information

All users please note
High-tension power lines, vehicles, training equipment and all equipment which emits electromagnetic fields could affect the system display. Disturbances of this type are usually of a temporary nature and in general functioning returns to normal by moving to an area away from the source of the interference.

Liability for functioning or damage
If the device is improperly repaired or serviced by persons who are not SG Sensortechnik employees or the device is used for a use not intended for, or is used in a way not complying with the instructions, liability for the functioning of the equipment is assumed by the owner or operator. SG Sensortechnik is not liable for damage which results from non compliance with the instructions. Our terms of delivery remain in effect.

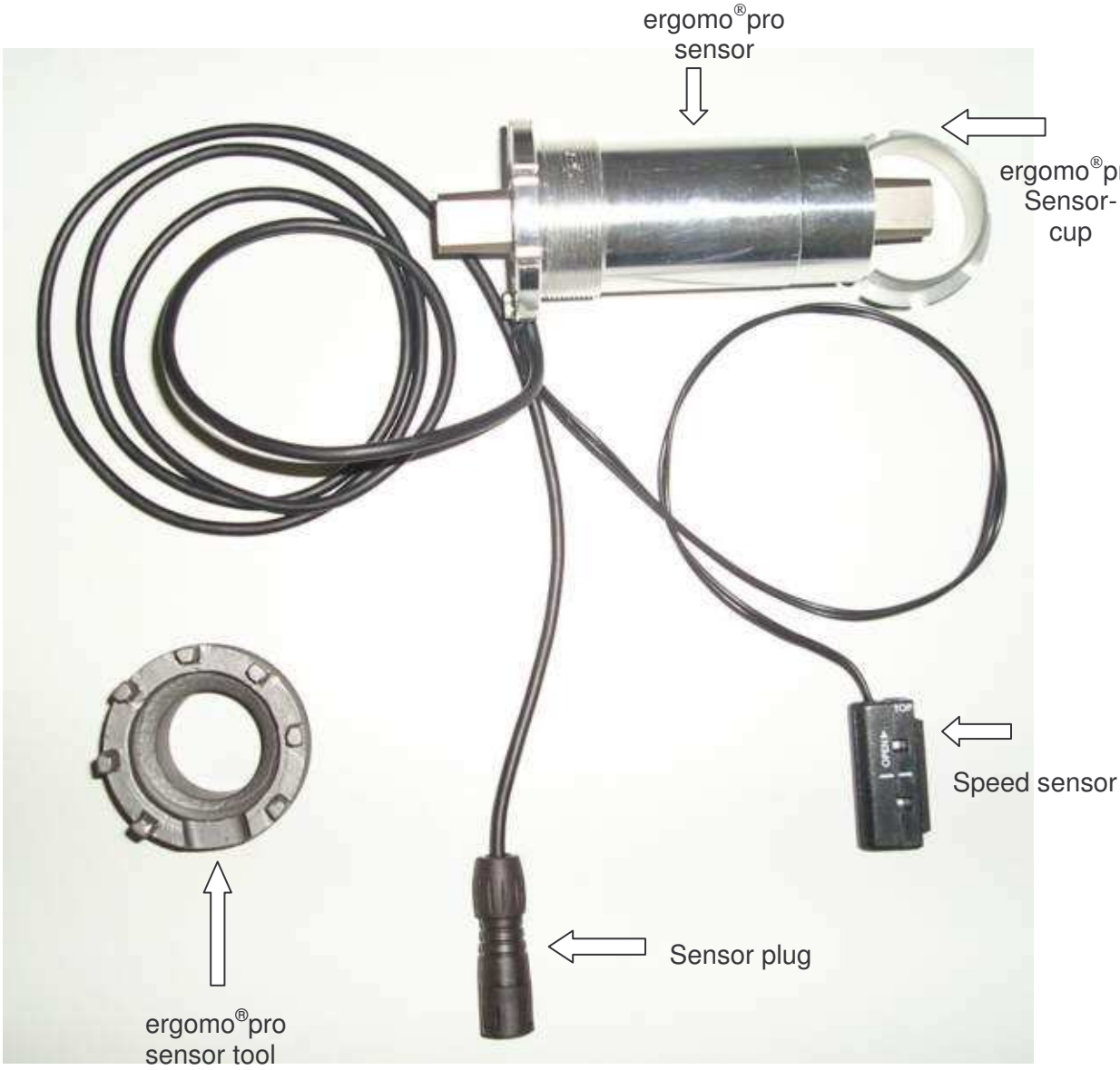
If the ergomo® pro computer display is blank, activate the reset button (see section 8, Debugging, p. 43). If the display still does not react, recharge the batteries of your ergomo®pro computer using the recharger.

Rechargeable batteries



There are two fixed nickel metal hybrid rechargeable batteries in your ergomo®pro computer. If the rechargeable batteries are no longer functioning correctly, for example, the use-time of the ergomo®pro computer is very short even though the batteries have been re-charged or the display no longer activates even though you have activated the reset and re-charged the batteries, then you are required, in accordance with your local recycling laws, to return your ergomo®pro computer to us, as the manufacturer, to allow us to replace or dispose the rechargeable batteries. We will replace the rechargeable batteries and return your overhauled ergomo®pro computer to you.

ergomo®pro sensor



Battery charger

To recharge the battery, connect the ergomo®pro computer with the micro controlled re-charger. The recharging time depends on the charge status of the battery, but takes about 6 hour.

Data transfer cable

If your PC does not have a serial port, a serial-USB adaptor is easily available from a computer specialist store or over the internet.

2. Starting up
2.1. Preparation

The following tools may be required for the installation:

- Tap set to re-thread the bottom bracket shell threads (optional)
- Facer set to re-face the bottom bracket shell edge (optional)
- The special ergomo®pro sensor tool to attach the ergomo®pro sensor
- Torque tool in range of 50 Nm – 70 Nm
- When appropriate, a drill for an outlet in the bottom bracket shell

Under certain conditions rethreading of the bottom bracket shell and re-facing the bottom bracket shell surface may be necessary. Rethreading avoids bending stress when mounting the ergomo®pro sensor. Rethreading ensures that the threads are optimally aligned so avoiding bending stress. Non-compliance with this instruction invalidates the warranty.

In case the ergomo®pro sensor can not be screwed smoothly into the bottom bracket shell, rethread both sides of the bottom bracket shell with the tap set.

In case the edges of the bottom bracket shell are not parallel or show an uneven surface, clean and prepare the bottom bracket shell edge with the facer set.

If possible, we recommend drilling a drainage hole at the lowest point of the lower bracket.

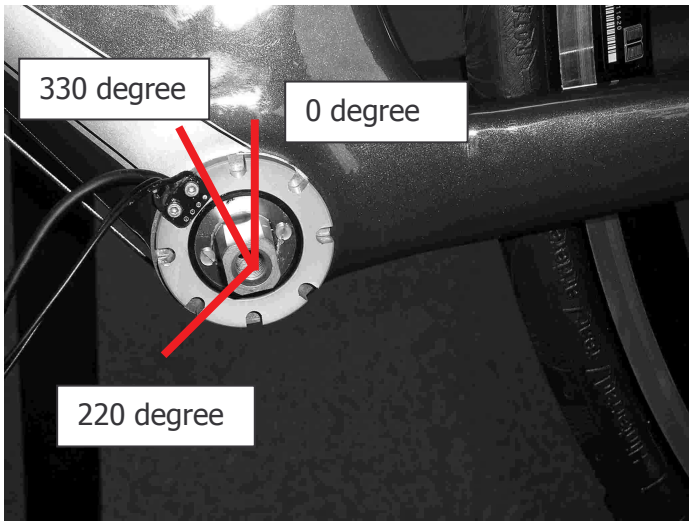
Clean then grease the bottom bracket threads.

2.2. Assembly sensor

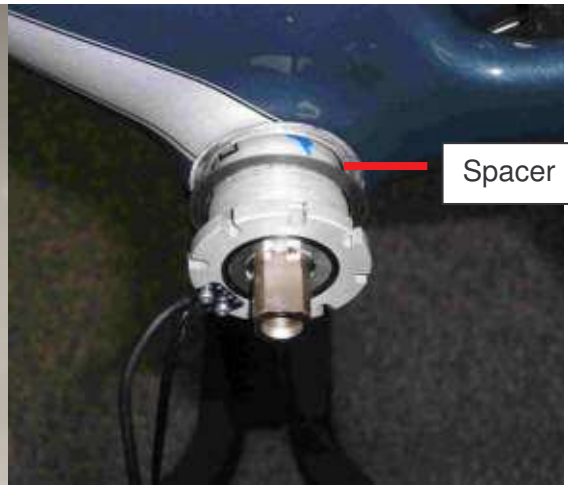
IMPORTANT: Remove any debris, e.g. a protruding screw, from the bottom bracket shell.
Make a note of the sensor's **calibration value (k-factor, CAL or K)**.
You'll find the **K factor** on the sensor.

Work from the **left side** of the bike – facing **the cycling direction**. Screw the ergomo®pro sensor by hand into the left side of the bottom bracket shell.

IMPORTANT:
In order to get a perfect power measurement result it is necessary to adjust the sensor in a certain position in the bottom bracket of the bicycle. The installation position is defined through the exit of the sensor cable in the range of 220 – 330 degrees.



Please us the enclosed spacers in order to achieve the defined installation position. Insert these spacers between the bottom bracket shell and the frame. The different width of the spacers allow to regulate the positioning of the cable.

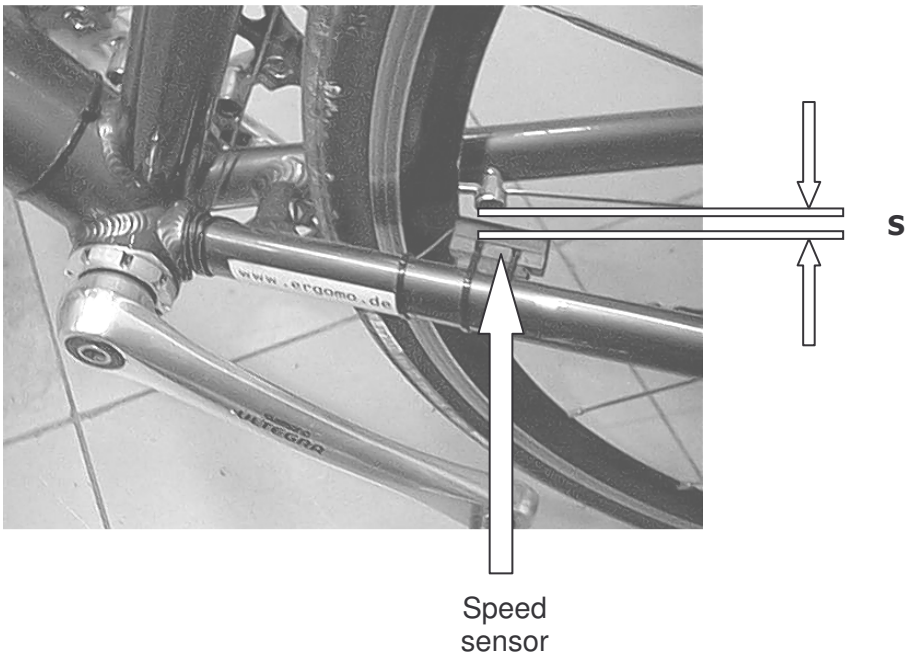


Grease the ergomo®pro cup inside and screw it by hand into the **right side** of the bottom bracket.

Use the ergomo®pro sensor special tool and a torque tool to tighten the sensor cup on the **right side** of the bike – looking in the cycling direction - with a torque of 50 – 60 Nm.

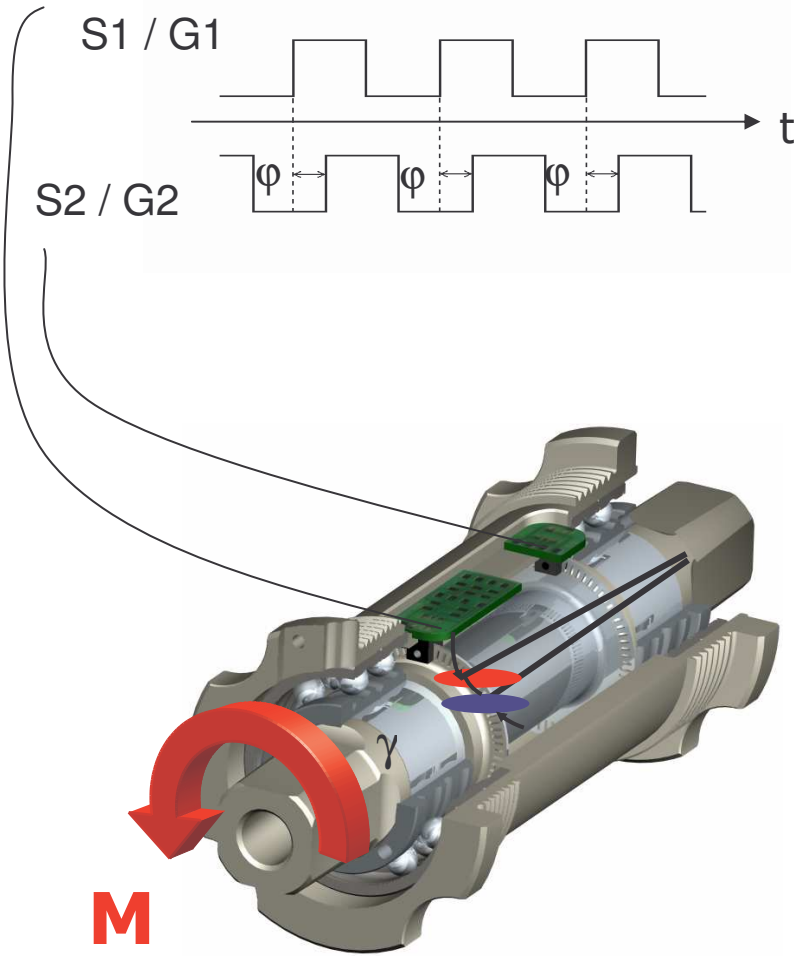
Use the ergomo®pro sensor special tool and a torque tool to tighten the ergomo®pro sensor with a torque of **55 – 65 Nm** on the left side of the bike – looking in the cycling direction.

Mount the speed sensor onto rear cycle frame and the magnet belonging to it on the rear wheel. The distance s between the sensor and magnet should be approx. 1 mm to 2 mm. You may need to move the magnet nearer to the spokes for optimum speed measurement.



Route the sensor cable (free of tension) to the ergomo®pro computer on the handlebar.

2.3. Measuring principle sensor



Description

The sensors S1 and S2 generate square wave signals together with the transmitter rings G1 and G2 . The waves are in a φ phase relationship.

When torque M is applied on the shaft, the shaft is twisted by an angle of γ and the phase position φ is proportionally altered.

The shifted phase position φ determines torque M. Using the pedal frequency n (72 impulses / pedal turn – n is determined at the same location) and M, power is calculated using the formula P = M x n [watt].

Main features

Optimum measurement of torque and pedal frequency is both determined at the same location. Torsion angle measured from φ = 0.0025°. This is equivalent to a force of F = 2.5 newtons on the pedal. Measurement precision is approx. 1%. The measuring principle is patented in USA and Europe.

2.4. Mounting computer

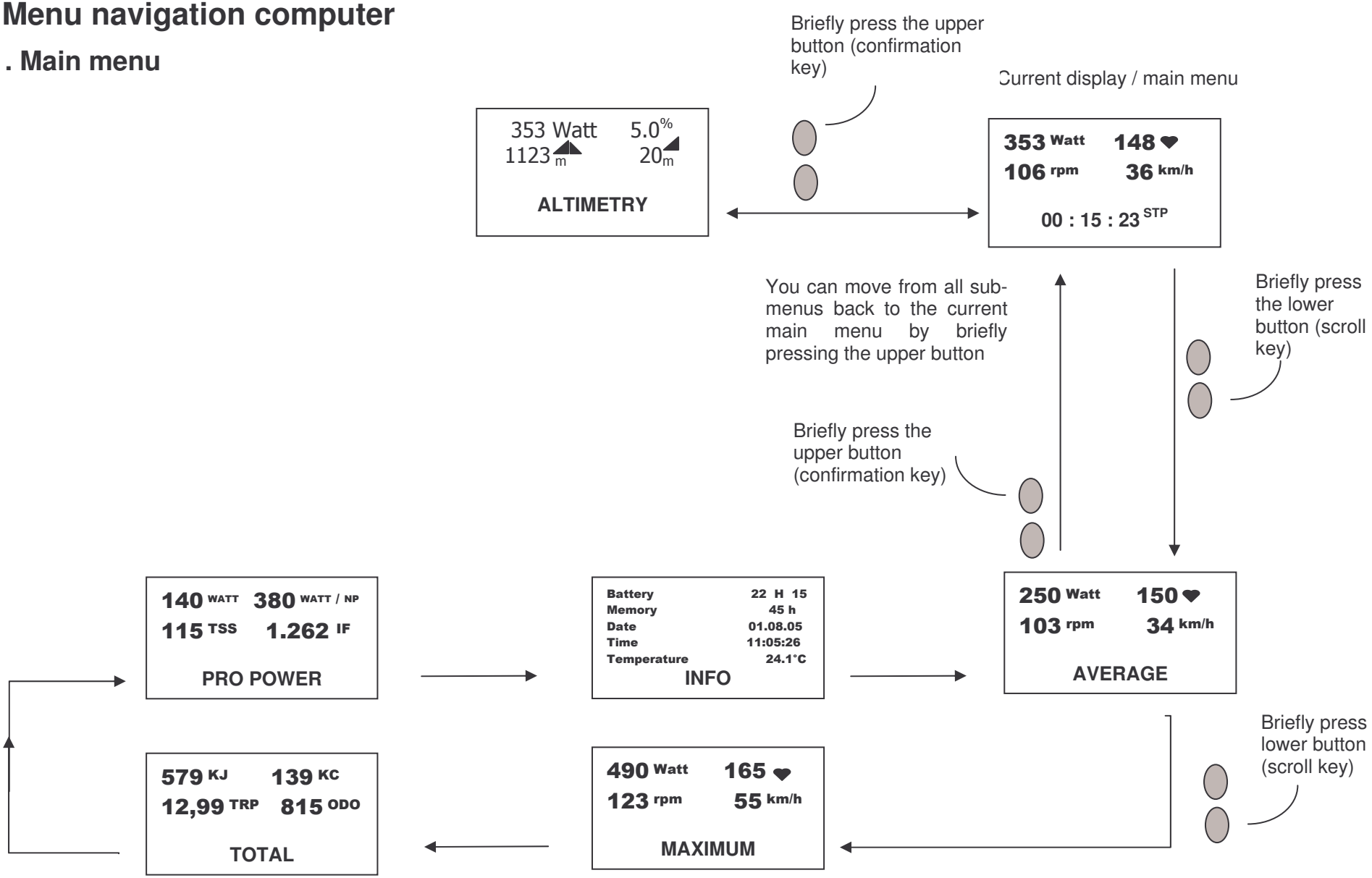
The ergomo®pro computer's holder must be mounted on the right handlebar to ensure a central position of the computer.

The ergomo® pro computer connector and plug are coded and can only be connected in **one** defined arrangement.

When the ergomo® pro computer has not received a signal from the bike for 3 mins, i.e. cadence signal, and the display buttons have not been activated, the ergomo® pro computer goes into sleep mode.

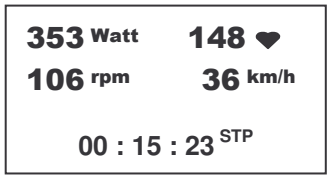
3. Menu navigation computer

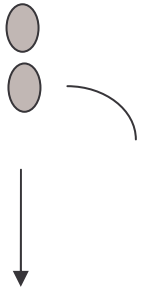
3.1. Main menu



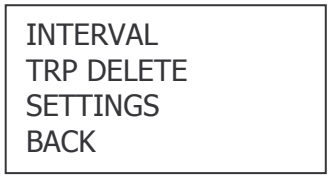
3.2. Sub menu

Current display / main menu



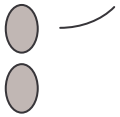


To move from the “current display/main display”, hold down the lower button (scroll key) until the following display appears:
.

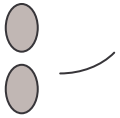


- Use the upper button (confirmation button) to go to the sub-menus.
- You can scroll through the sub-menus Interval, TRP delete and settings.

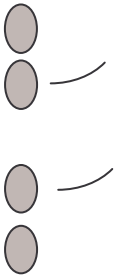
3.2.1. Handling



You confirm the highlighted program, highlighted function of figure/number by briefly pressing the upper button (confirmation key).

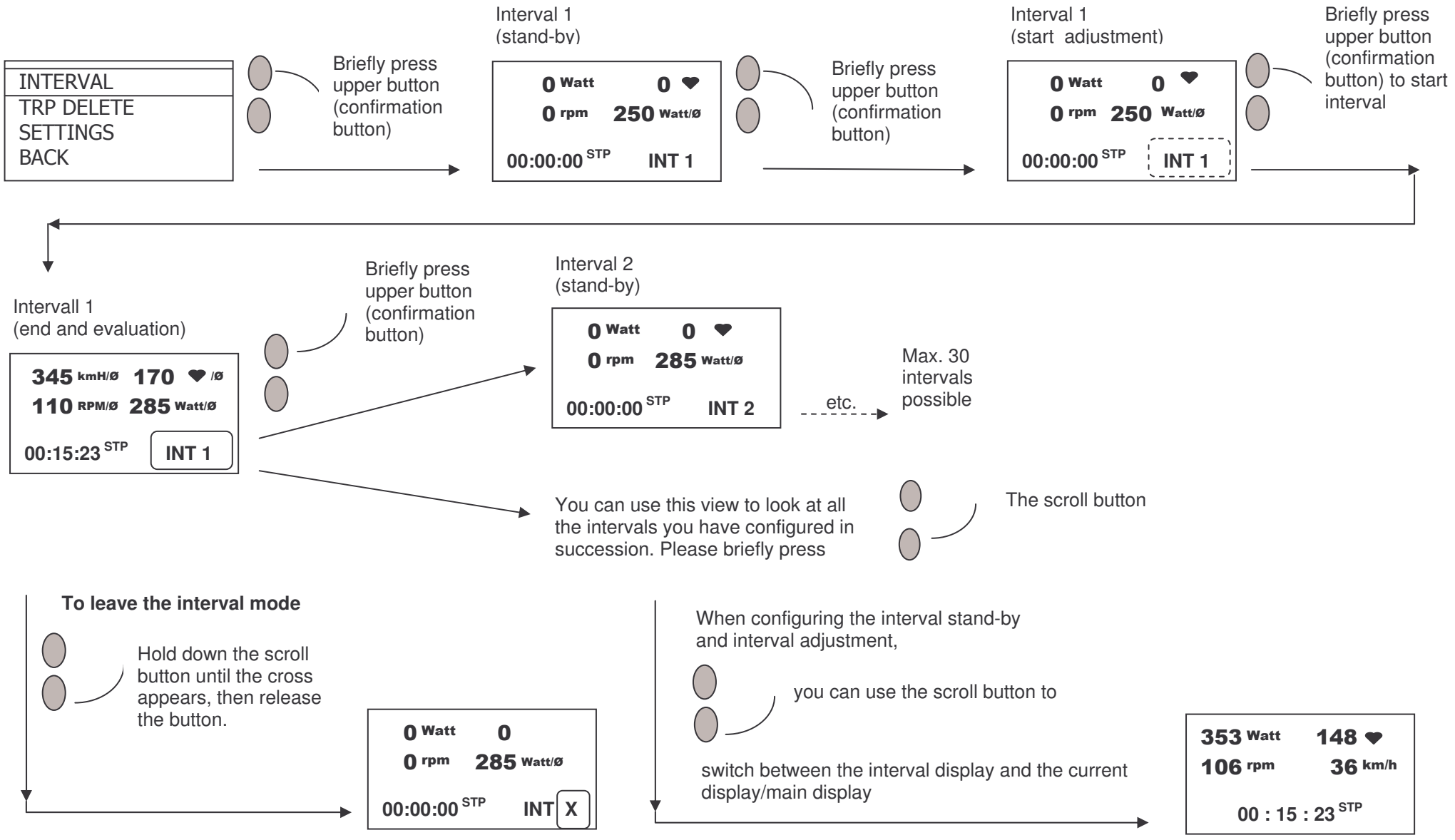


You scroll from one menu item to the next or from one figure to the next by briefly pressing the lower button (scroll key).

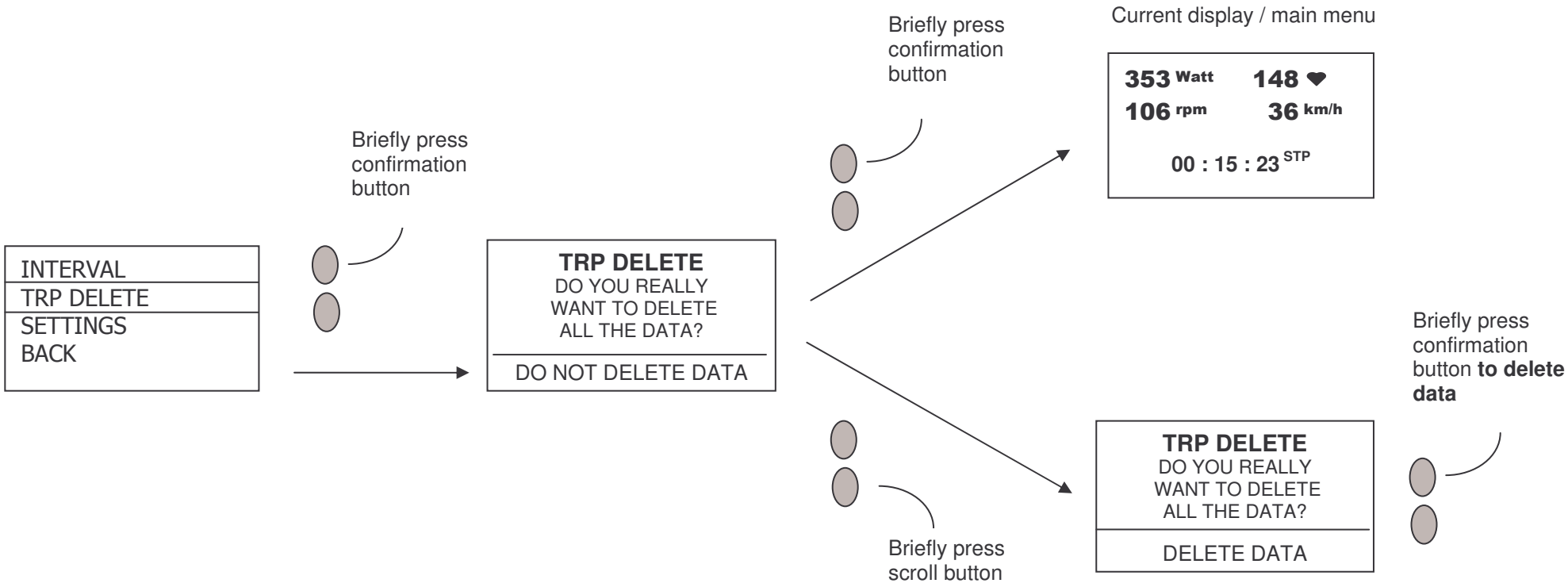


To return to the main menu from the sub-menu, scroll through the sub-menus with the scroll button and use the upper button (confirmation key) to confirm theX at the lower right of the screen.

3.2.2. Interval

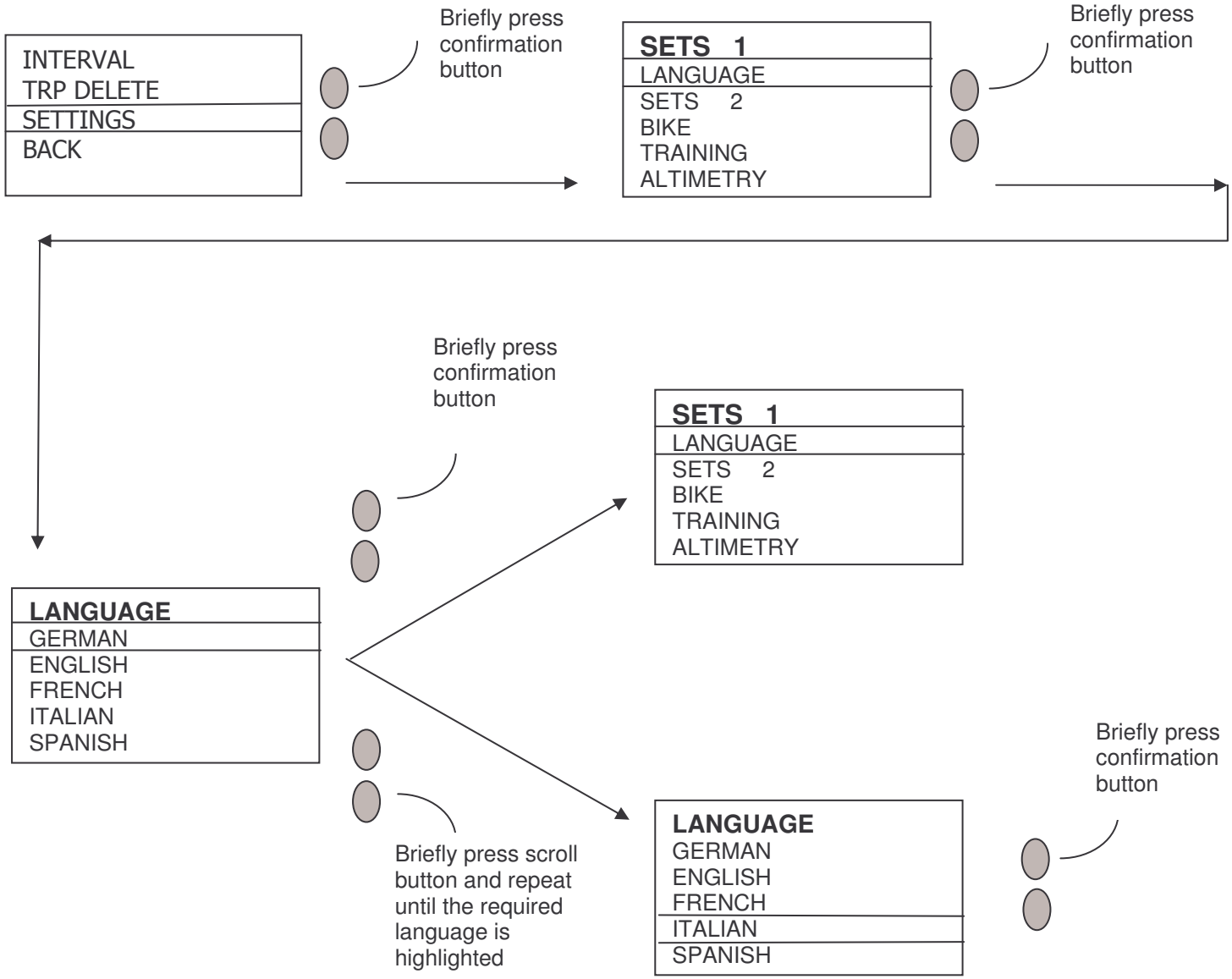


3.2.3. Trip delete

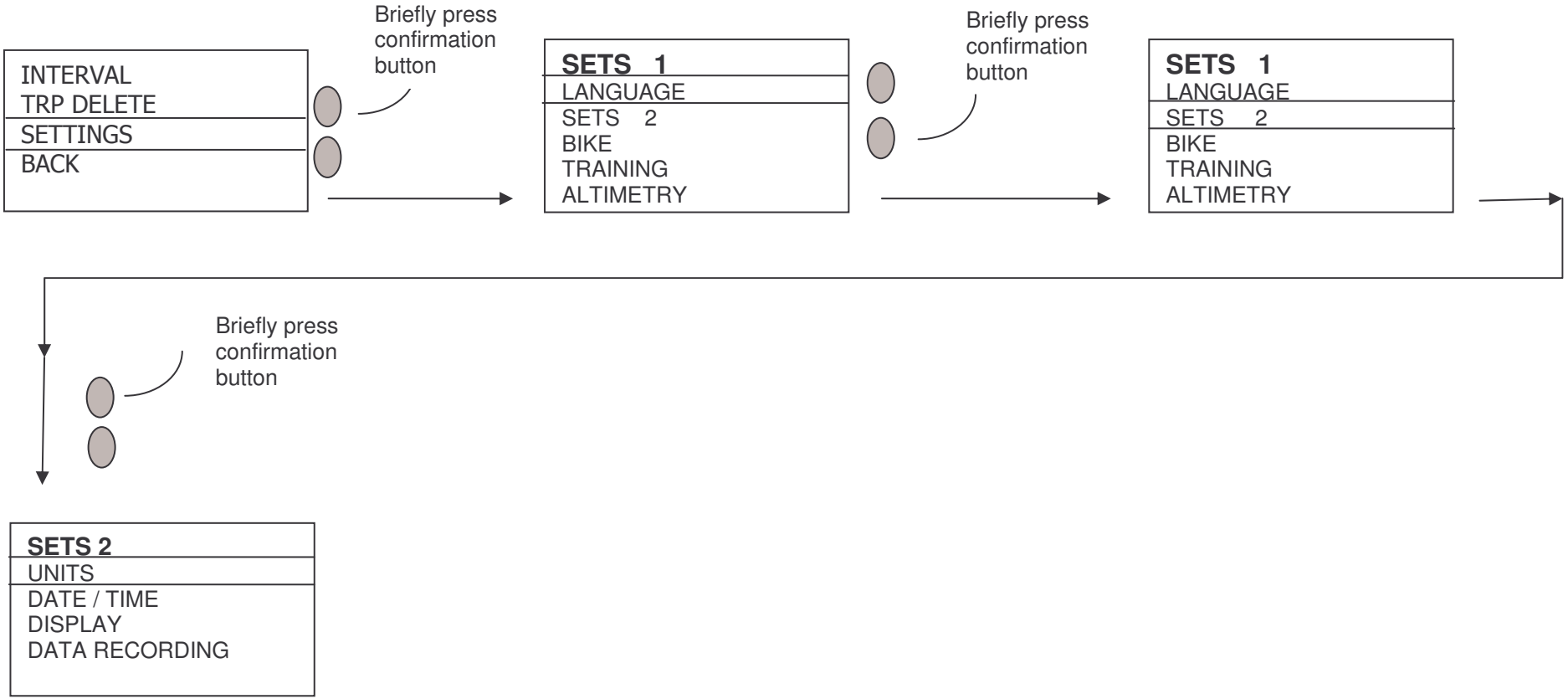


You can delete data from a day's trip on the ergomo® pro computer display using the TRP delete function. Data for the PC (recorded data) is not deleted with the above function.

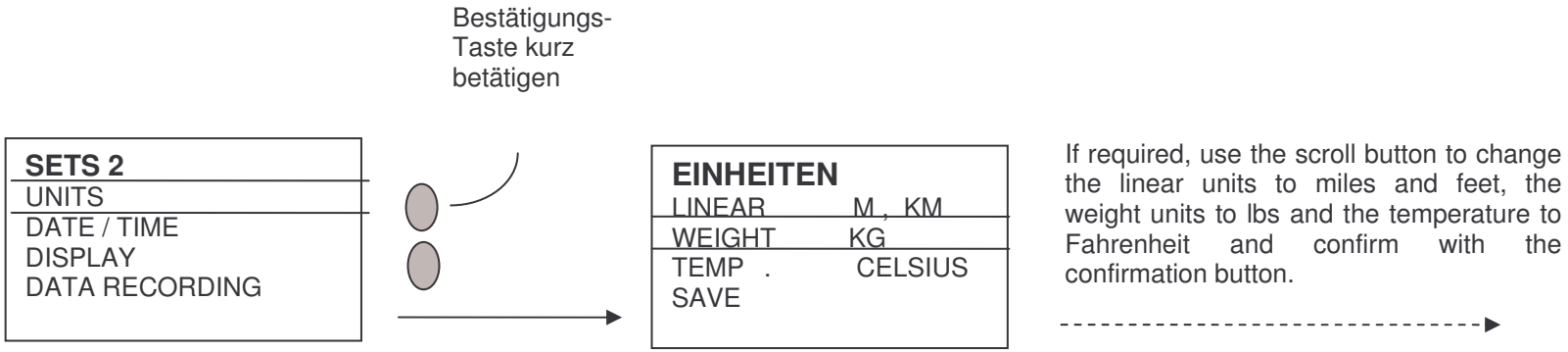
3.2.4. Language



3.2.5. Sets 2

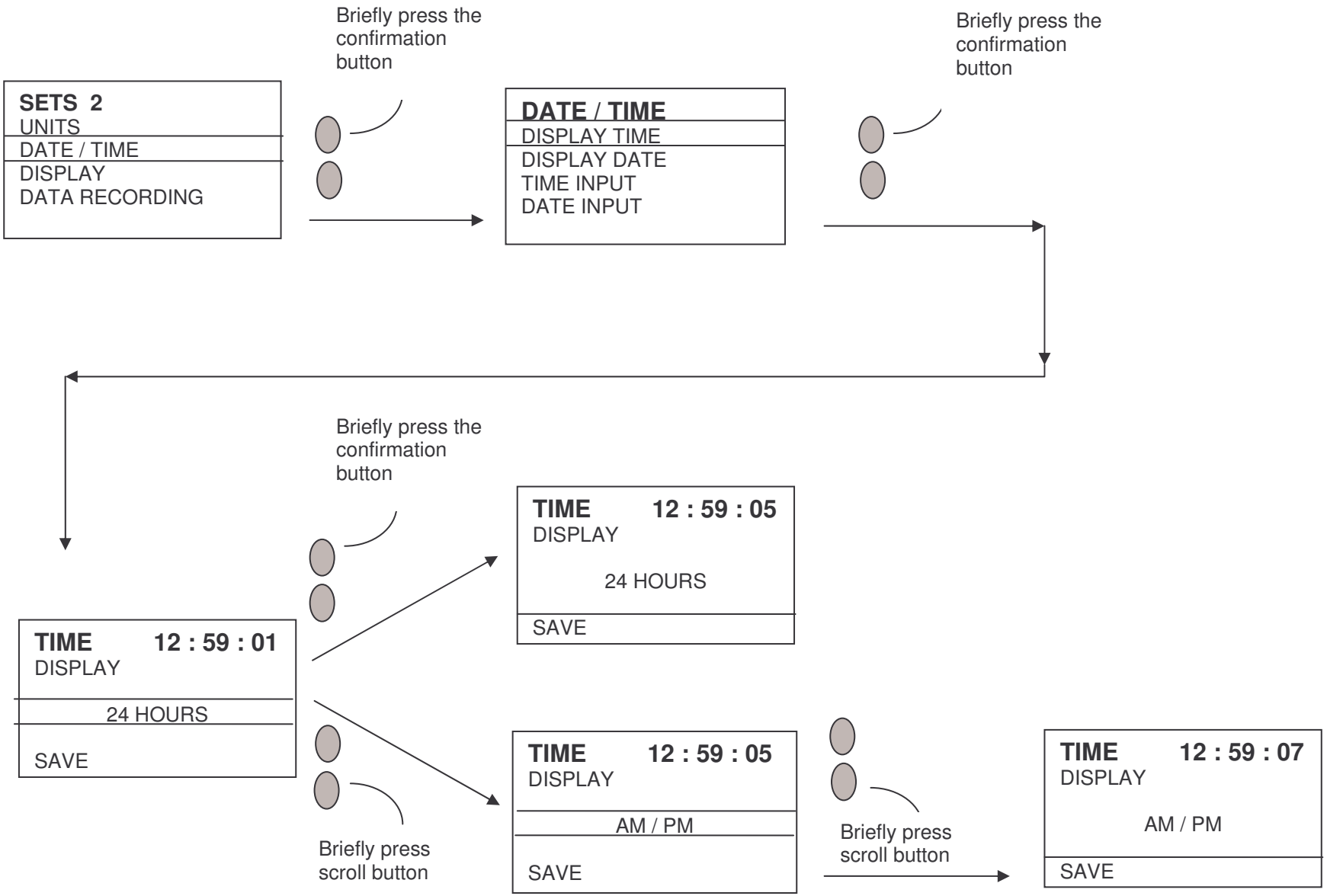

INTERVAL
TRP DELETE
SETTINGS
BACK
Briefly press confirmation button
SETS 1
LANGUAGE
SETS 2
BIKE
TRAINING
ALTIMETRY
Briefly press confirmation button
SETS 1
LANGUAGE
SETS 2
BIKE
TRAINING
ALTIMETRY
Briefly press confirmation button
SETS 2
UNITS
DATE / TIME
DISPLAY
DATA RECORDING

3.2.6. Units

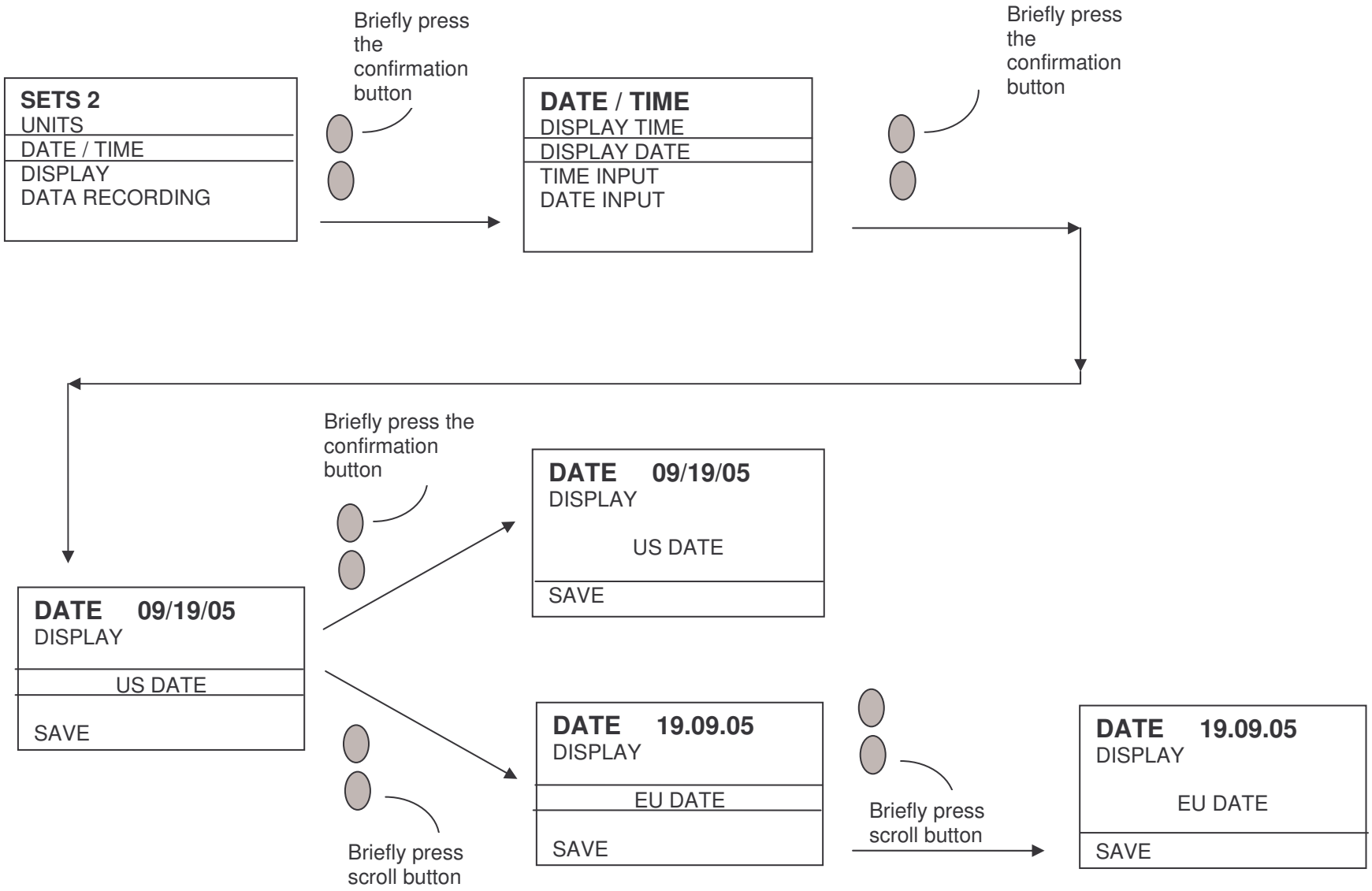


If required, use the scroll button to change the linear units to miles and feet, the weight units to lbs and the temperature to Fahrenheit and confirm with the confirmation button.

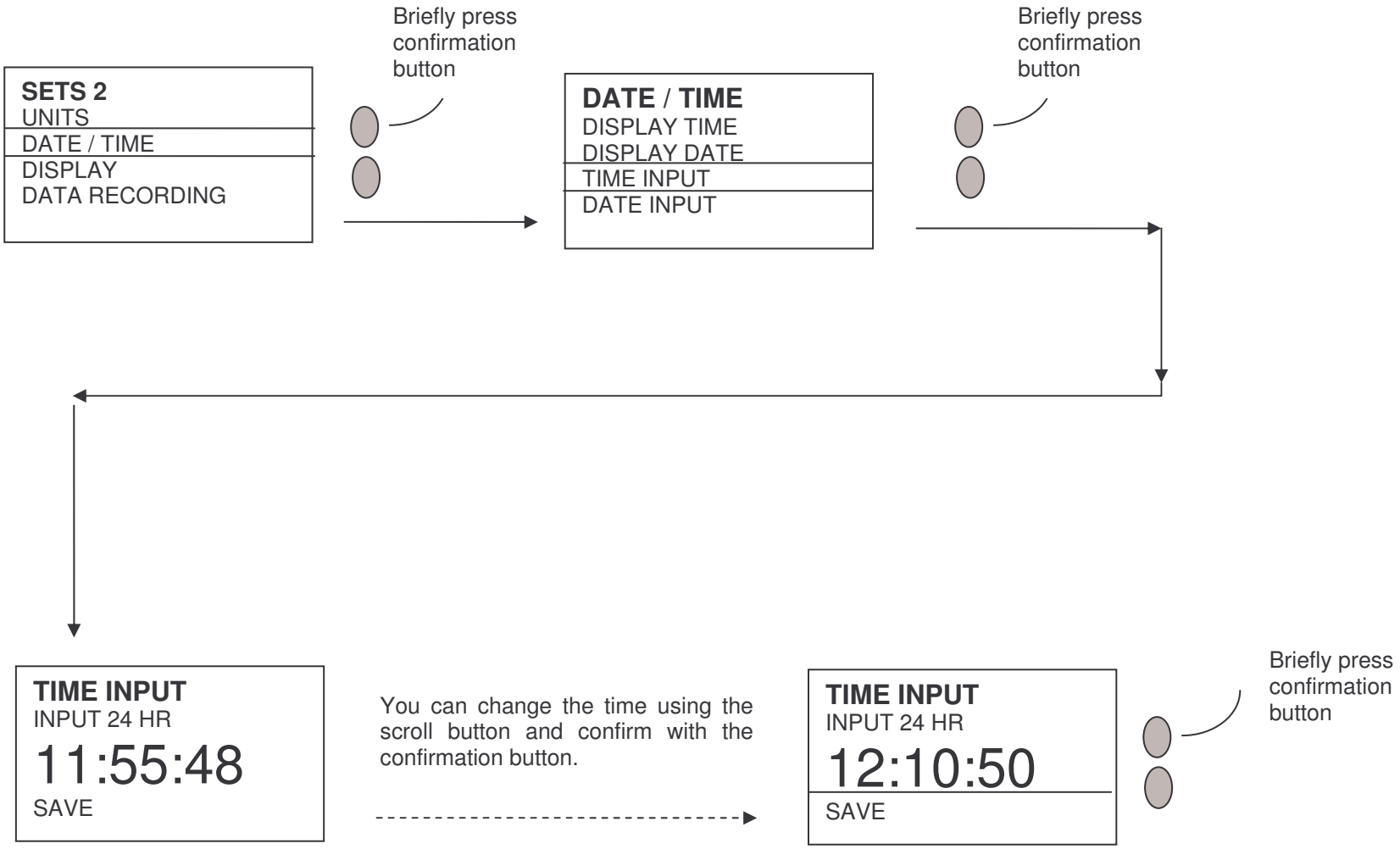
3.2.7. Display time



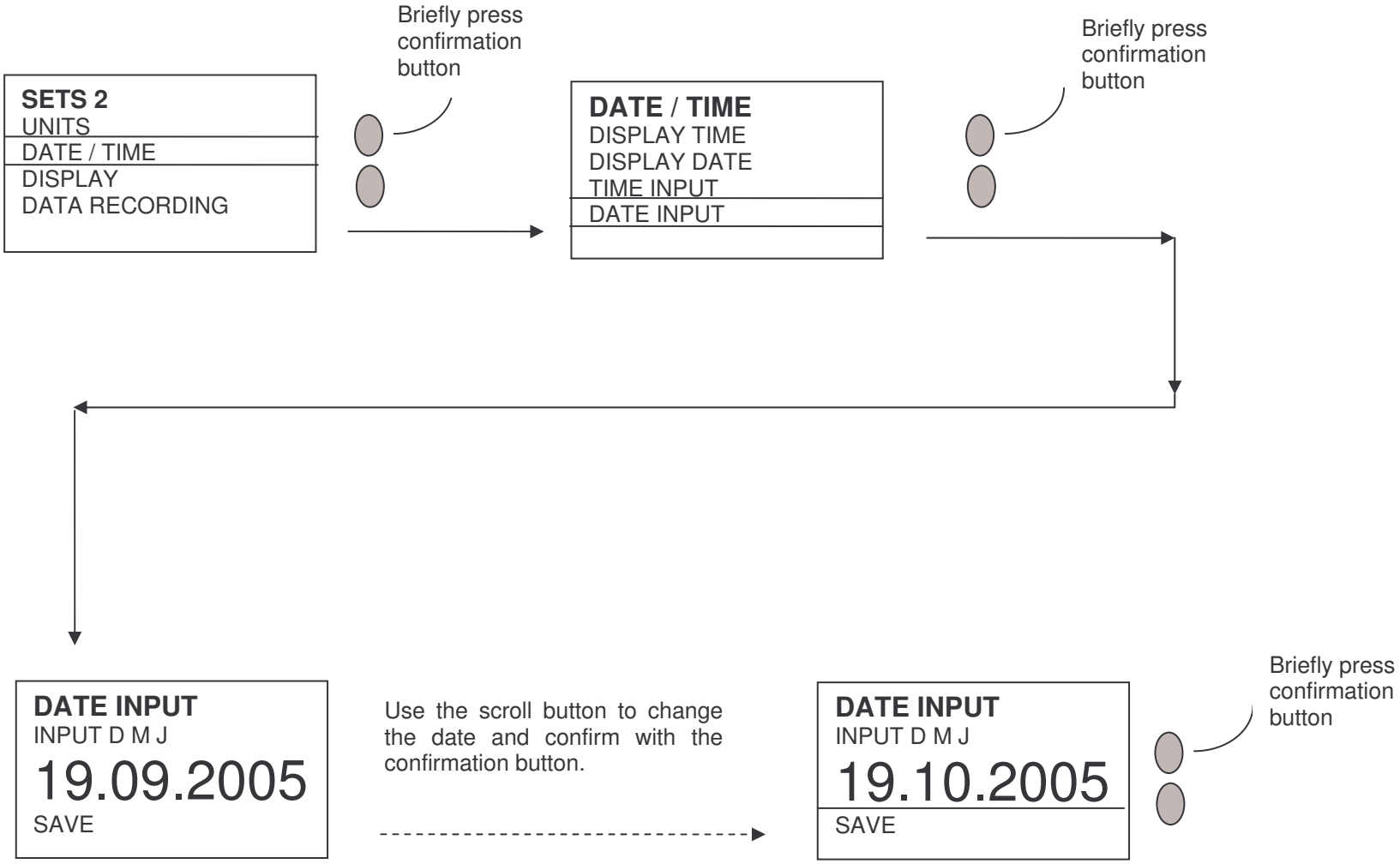
3.2.8. Display date



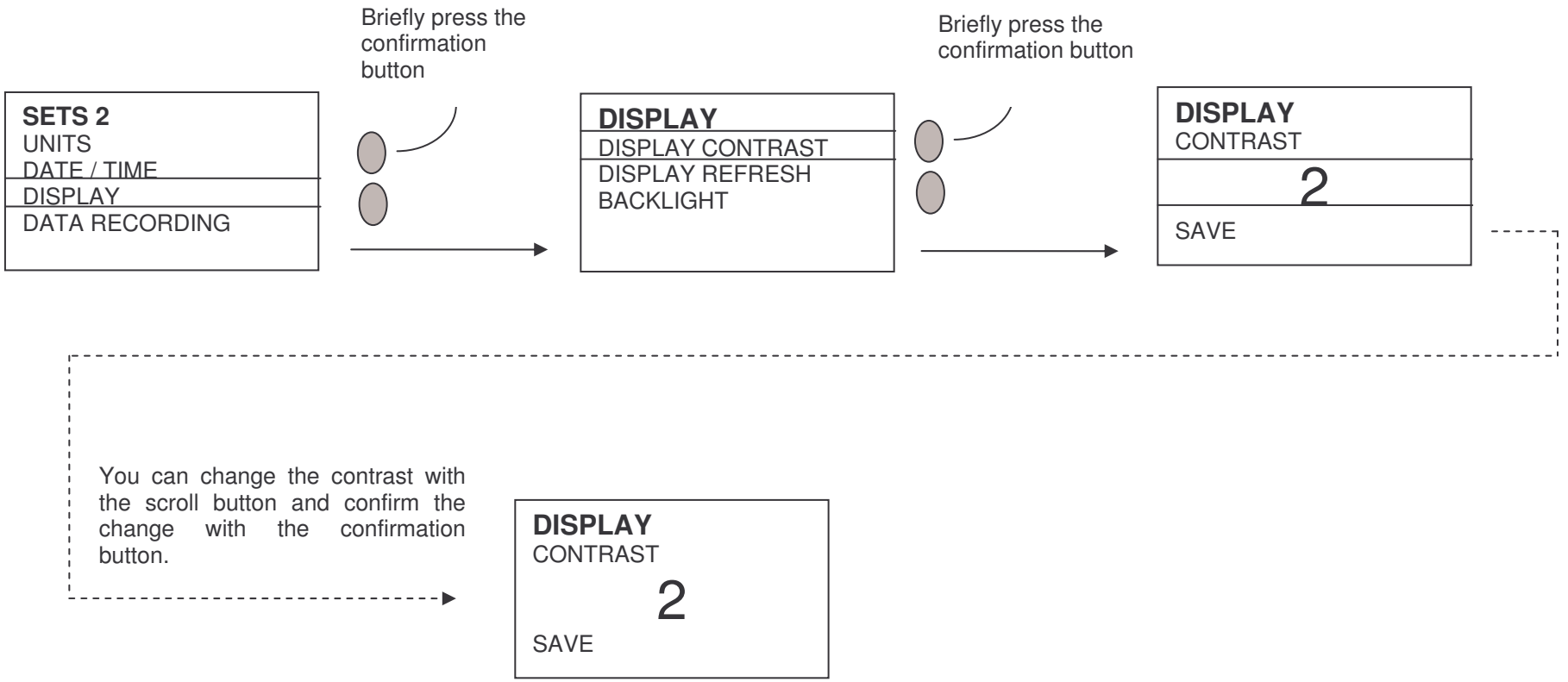
3.2.9. Time input



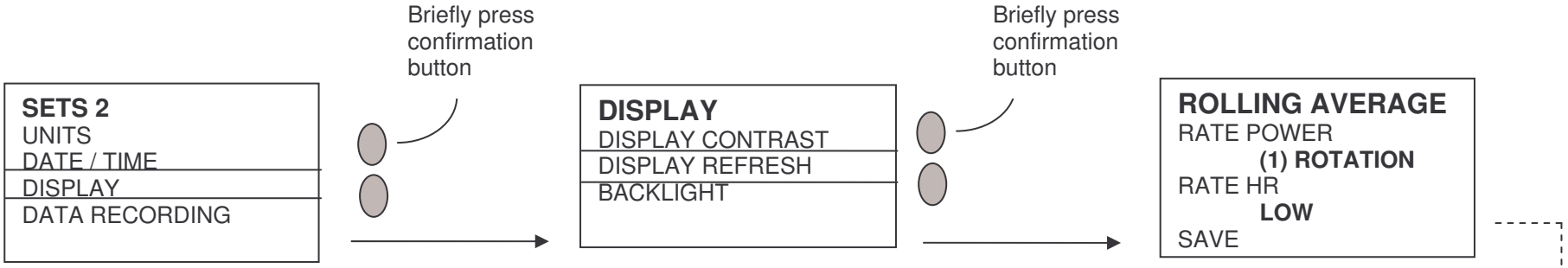
3.2.10. Date input



3.2.11. Display contrast



3.2.12. Display refresh



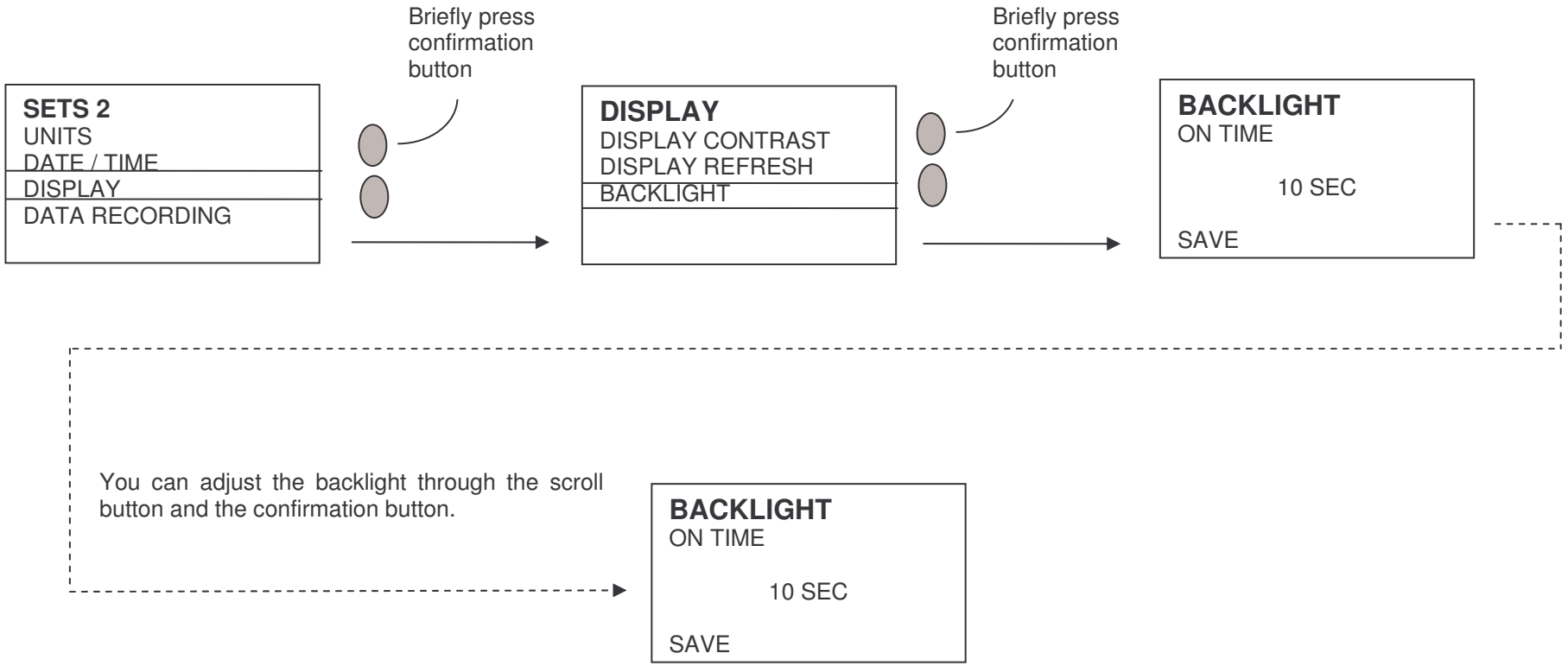
You can adjust the measurement rate through the scroll button and the confirmation button.

ROLLING AVERAGE
RATE POWER
(3) ROTATION
RATE HR
NORMAL
SAVE

Here is the explanation:
None (1) means 1 measurement per 1 pedal turn
Low (2) means 1 measurement per 2 pedal turns.
Normal (5) means 1 measurement per 5 pedal turns.
Strong (7) means 1 measurement per 7 pedal turns.
V.Strong(10) means 1 measurement per 10 pedal turns.

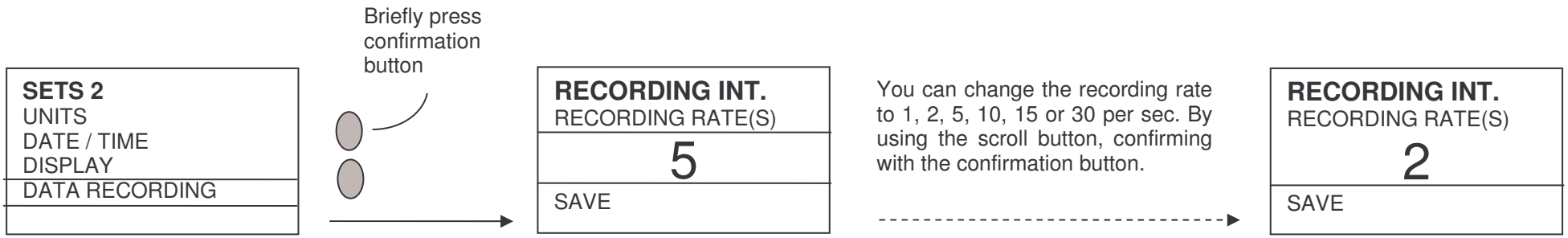
Here is the explanation:
None (1) means 1 old pulse value plus 1 new pulse value
Low (2) means 2 old pulse values plus 1 new pulse value
Normal (5) means 5 old pulse values plus 1 new pulse value
strong (7) means 7 old pulse values plus 1 new pulse value
V.Strong (10) means 10 old pulse values plus 1 new pulse value

3.2.13. Backlight



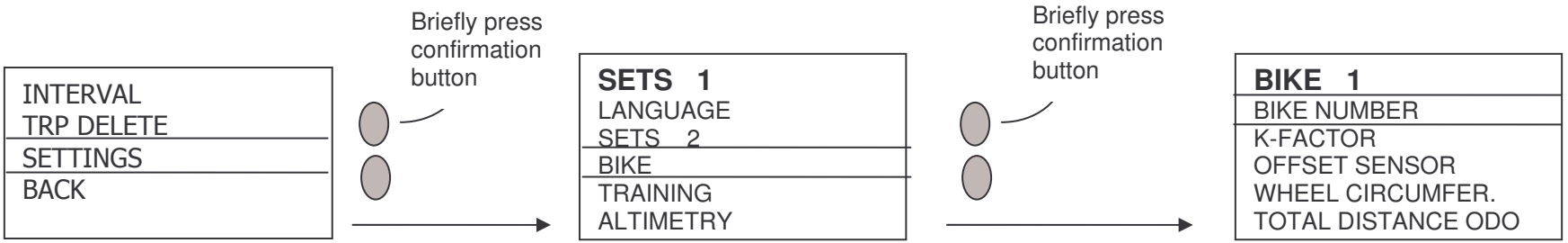
Please press and hold down the ergomo®pro computer's upper button (confirmation button) until the backlight switches on. The backlight remains on for 10, 30 or 60 seconds according to the backlight setting and switches off automatically. When setting ON/OFF mode you can switch the backlight on and off through holding down the upper button (confirmation button).

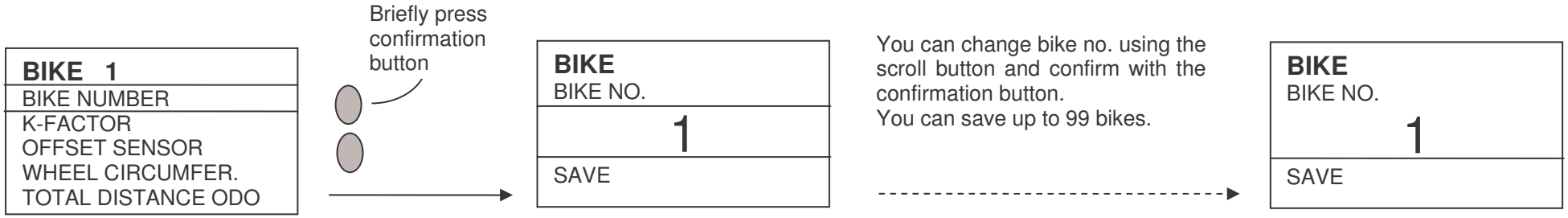
3.2.14. Data recording



Data is recorded automatically when the stop-clock is running. The stop-clock is activated by the bike i.e., turning the pedals. The memory has capacity for approx. 12 hours of recording at a recording rate of one recording per second. When the memory is full and you continue to ride your bike with its build-in ergomo® pro system, the oldest data will be overwritten by the newest data. The current amount of memory space is shown on the information display, when the memory is full, you can reset the memory over your PC.

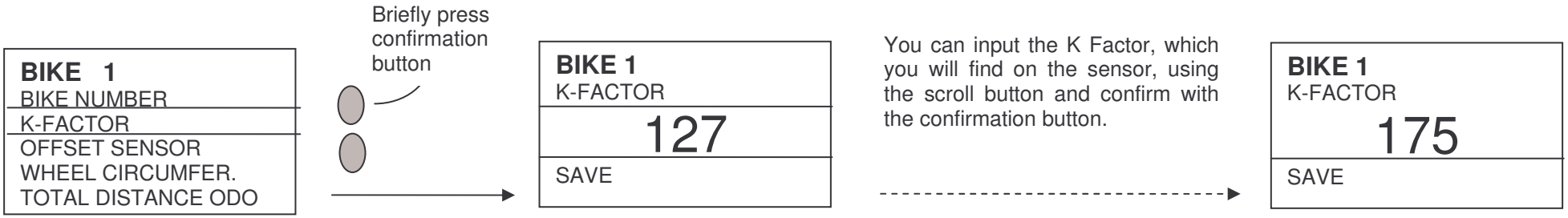
3.2.15. Bike number



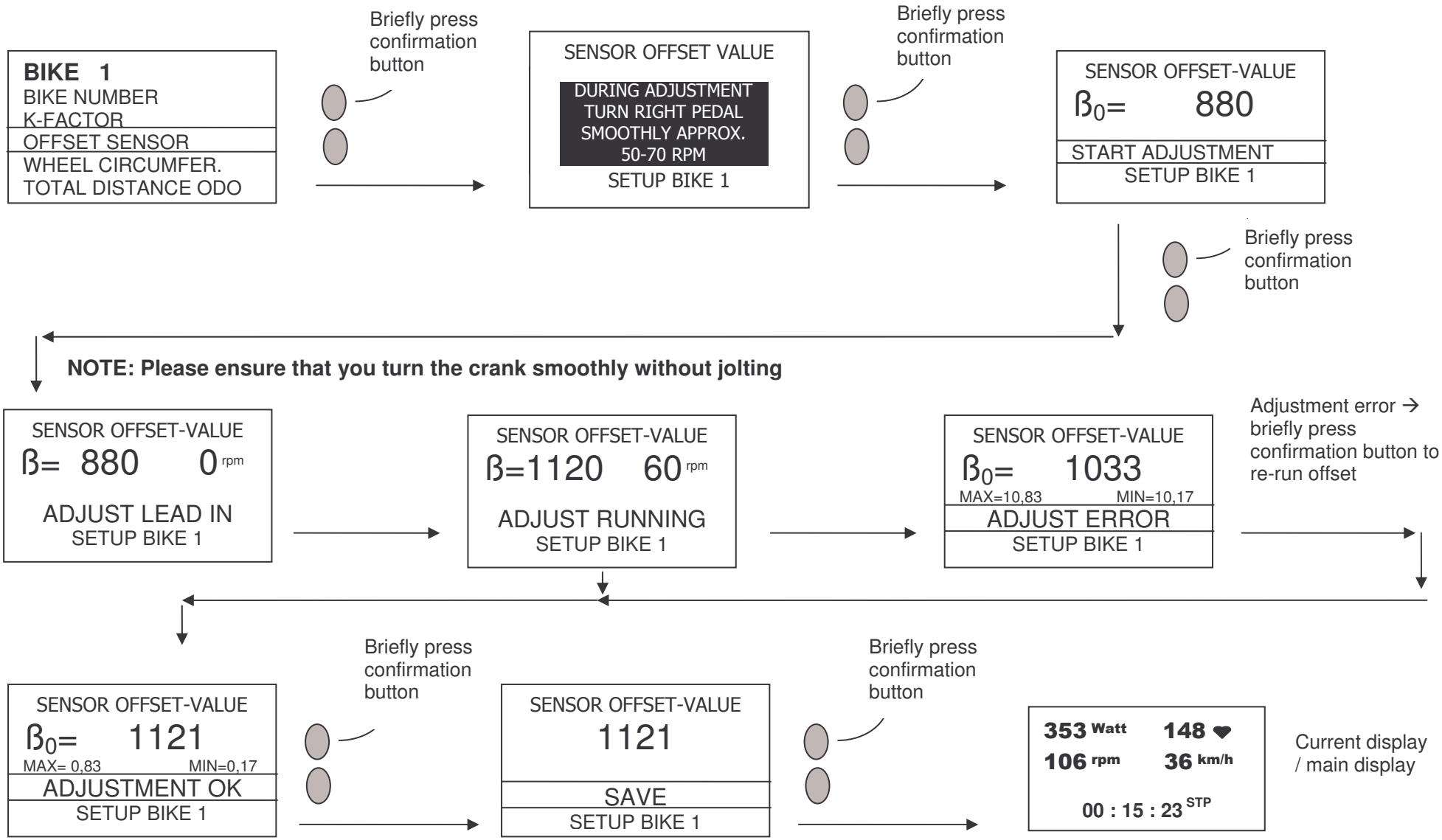


NOTE:
You must have a k factor and offset for each bike no.

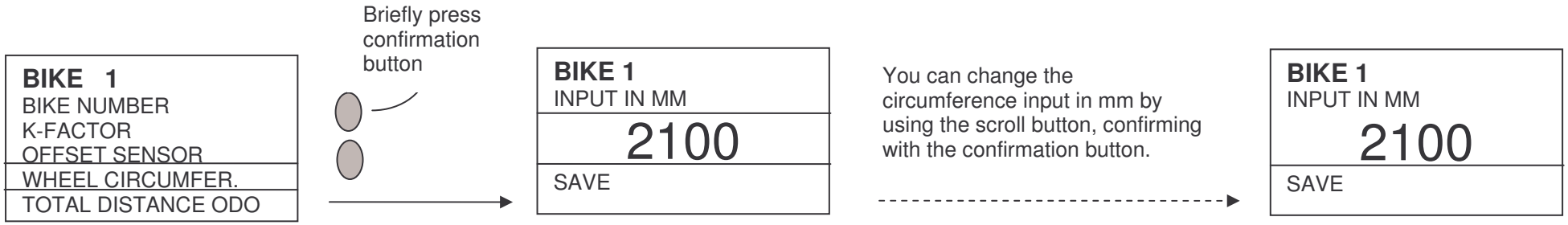
3.2.16. K-factor



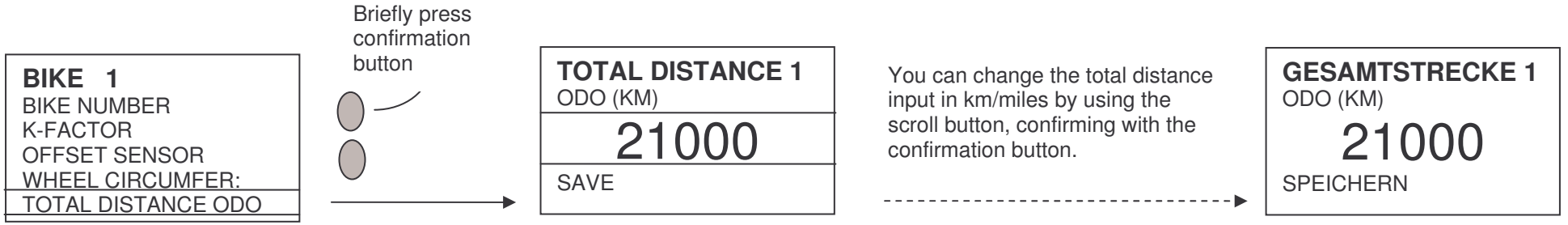
3.2.17. Offset sensor



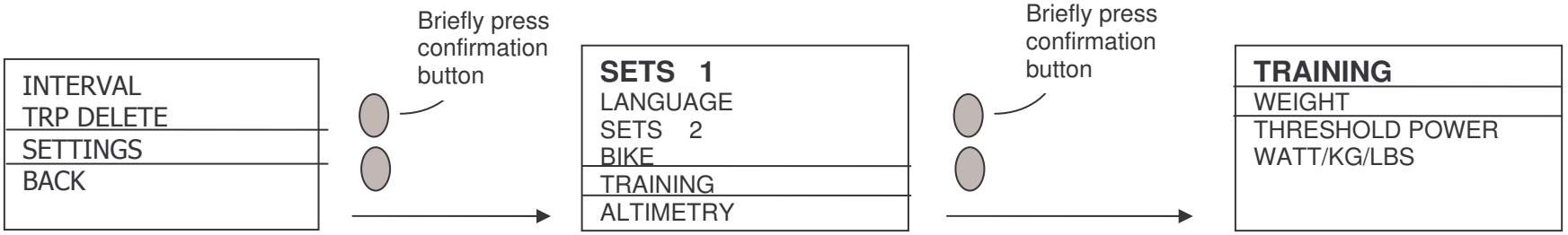
3.2.18. Wheel circumference

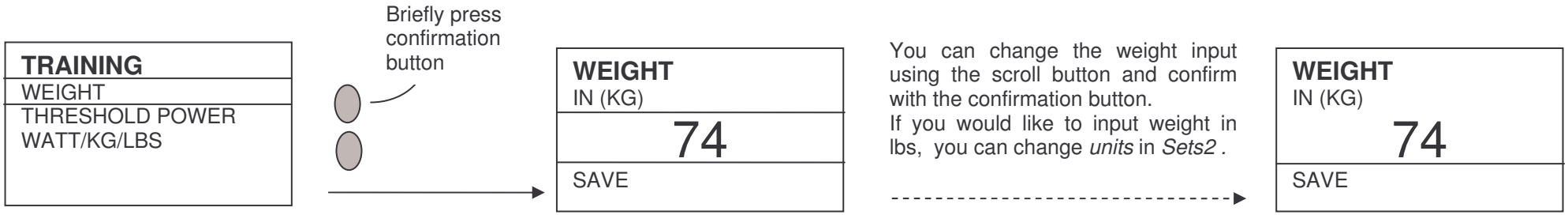


3.2.19. Total distance ODO

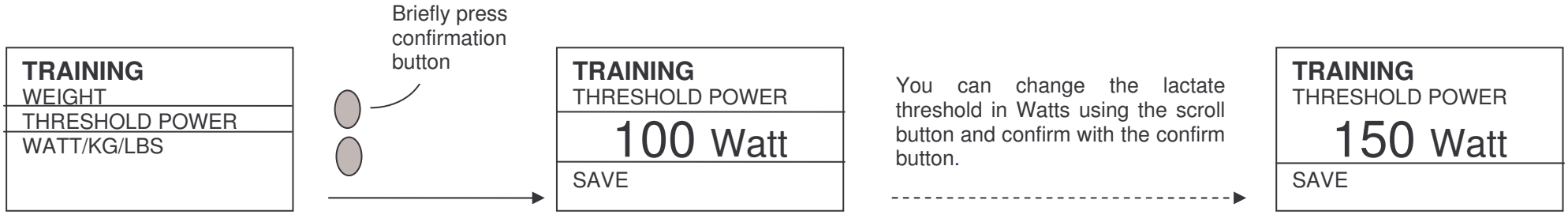


3.2.20. Weight

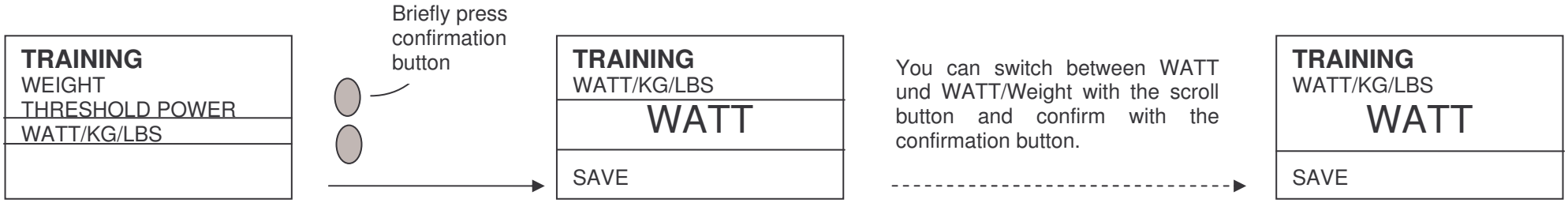

INTERVAL
TRP DELETE
SETTINGS
BACK
Briefly press confirmation button
SETS 1
LANGUAGE
SETS 2
BIKE
TRAINING
ALTIMETRY
Briefly press confirmation button
TRAINING
WEIGHT
THRESHOLD POWER
WATT/KG/LBS


TRAINING
WEIGHT
THRESHOLD POWER
WATT/KG/LBS
Briefly press confirmation button
WEIGHT
IN (KG)
74
SAVE
You can change the weight input using the scroll button and confirm with the confirmation button.
If you would like to input weight in lbs, you can change *units* in *Sets2* .
WEIGHT
IN (KG)
74
SAVE

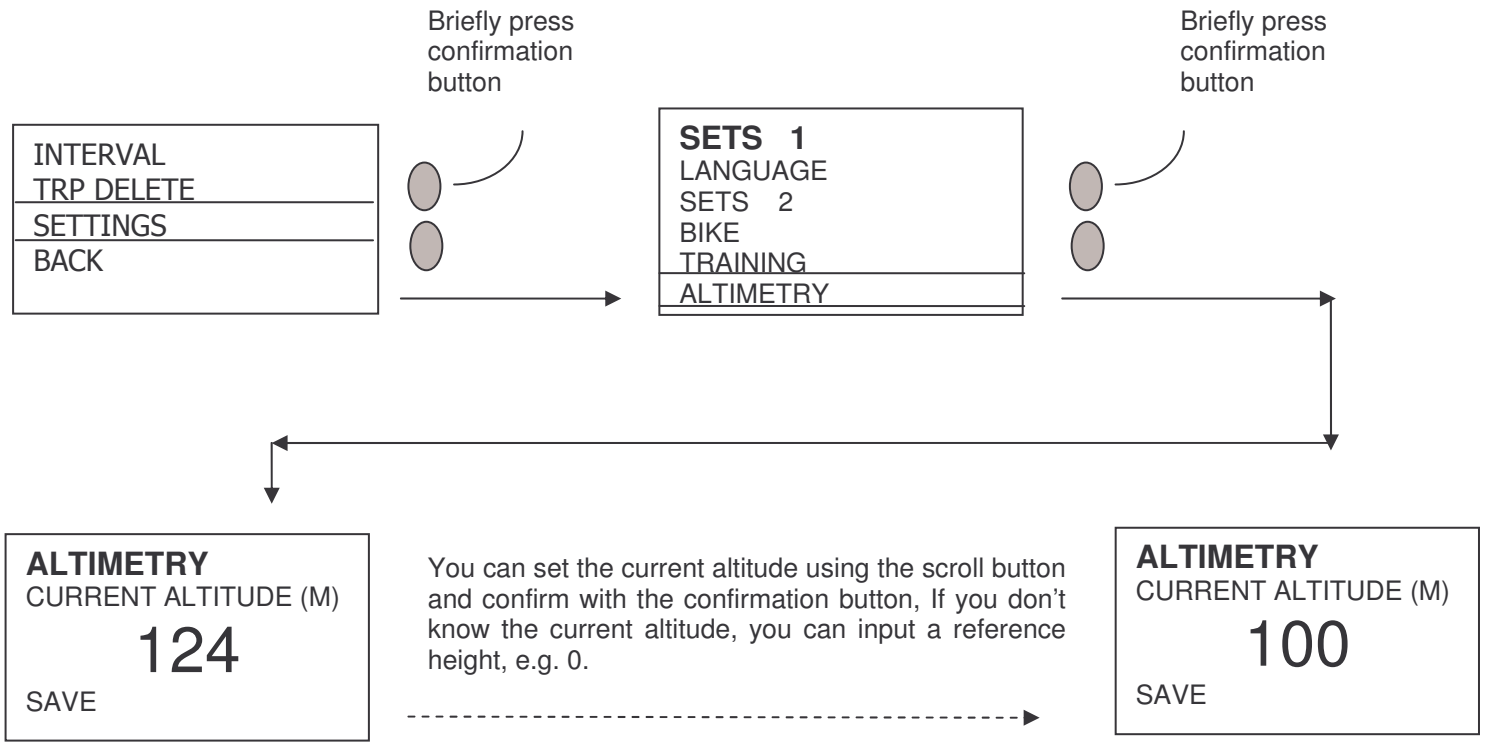
3.2.21. Threshold power



3.2.22. WATT/KG/LBS



3.2.23. Altimetry



4. Offset sensor
4.1. General information

Position the bike in a manner which allows free turning of the rear wheel.

Before you begin with the off set procedure, select the biggest gear ratio, put the chain on the **smallest** sprocket on the rear wheel and the **largest** chainwheel on the front wheel.
The increased resistance means that the crank movement is smooth and jolt-free (important for the offset).

Connect the sensor to the ergomo® pro computer. It is easier to operate the ergomo® pro computer at a raised level (e.g. on a chair) to the right of your bike so that you can complete the offset on the ergomo® pro computer more easily and so you can see the display.

You need the calibrated value or k factor to correctly measure power in watts.

Technically, the specific force-free sensor offset value is equivalent to the zero point of the sensor. When the sensor spindle is subjected to torque, the zero point changes and the difference between the zero point and the new value is used to calculate power in watts. Input the K factor into the corresponding sub-menu of your ergomo®pro sensor.

4.2. Implementation

Ensure that the rear wheel can turn freely. Follow the instructions in the ergomo®pro computer display in the Offset sub-menu, the Offset procedure ends with feedback from the display. The Offset needs to be repeated after the first ride to release any tension which would change the offset value. You can repeat the offset as often as you like. However, this is not mandatory as the ergomo®pro sensor is not temperature sensitive.

4.3. Control

Verify the offset with the following steps:

1.) Select the biggest gear ratio, i.e. put the chain on the **smallest sprocket** on the rear wheel and the largest **chainwheel** on the front wheel. Ensure that the rear wheel can turn freely.

Turn the **right** crank at about 60 pedal turns/min. Turn the pedals smoothly and without jolting. Please watch the *ergomo®*pro computer display while doing this. Display power **right** should be between **0 and 5 watts.**

2.) Select the biggest gear ratio, i.e. put the chain on the **smallest sprocket** on the rear wheel and the largest **chainwheel** on the front wheel. Ensure that the rear wheel can turn freely.

Turn the **left** crank at about 60 pedal turns/min. Turn the pedals smoothly and without jolting. Please watch the *ergomo®*pro computer display while doing this. Display power **left** should be between **5 and 15 watts**.

After the first few rides, some of the mechanical tension between the sensor and the bottom bracket shell is released. This leads to a slight alteration of offset value. To have maximum accuracy in measurement of power in watts, it is therefore recommended to repeat the offset after the first few rides.

Offset adjustment may be repeated **as often as you like**. This is, however, not mandatory.

5. ergoRacer® Software
5.1. Installation

Insert your CD into your computer. Be sure to install on the computer that you will download your power meter to because ergoRacer® can only be installed on one machine.

You will need to connect to the Internet in order to unlock your software and register it. To register you have to click the blue link, “Get my registration key” when you start ergoRacer® software first. Input your Cdkey (sticker on sleeve) into the web page, that you are directed to after clicking the blue link, “Get my registration key”. You will then be given a key on the webpage which you need to copy and paste into the dialogue Box on ergoRacer® software. Click Register and You’ are done, just fill out the 1st time Wizard with your information.

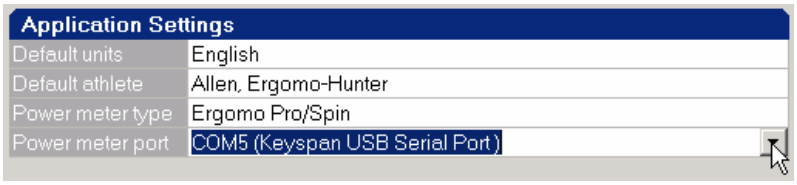
If you cannot connect to the internet, then if you have a Web browser, we can get you a key. Click on the blue link and let the computer open your web browser. Then get the web address that it is trying to goto, write this down and email that address to us. The internat adress looks like this one:
http://www.cyclingpeakssoftware.com/members/login.php?code=7FD6FA69&code2=36010O10&done=genkey.php
We will send you a return email with your code and you can then paste this in the box to unlock the software.

We highly recommend you click the >HELP< button at the top of the page and read the Quick Start Guide and also Users Guide. These will teach you how to download, bulk import past data, and also the features of the software. IF you need help, please consult the >HELP< first. Second, consult the Help Forum at http://www.cyclingpeakssoftware.com/forums/ or the ergomo® webpage www.ergomo.net . Third, send an email to CyclingPeaks Software (Support@cyclingpeakssoftware.com or 540-586-0919) or contact the technical support of SG Sensortechnik GmbH & Co. KG (support@sg-sensortechnik.com or 0049-6105-2731-0)

To transfer data to your PC, plug the data transfer cable into the socket on the ergomo® pro computer and the serial port of your PC. If your PC does not have a serial port, you need a serial/USB adapter – easy to purchase over the internet or from a computer supplies outlet. These adapters are also available through SG Sensortechnik GmbH & Co. KG. Activate the ergomo® pro computer by pressing one of the two buttons – the computer may be in sleep mode. It is possible to transfer data from all of the menus except the input menus (i.e. not from the sub-menus “units”, settings k factor or the offset menu, etc.)

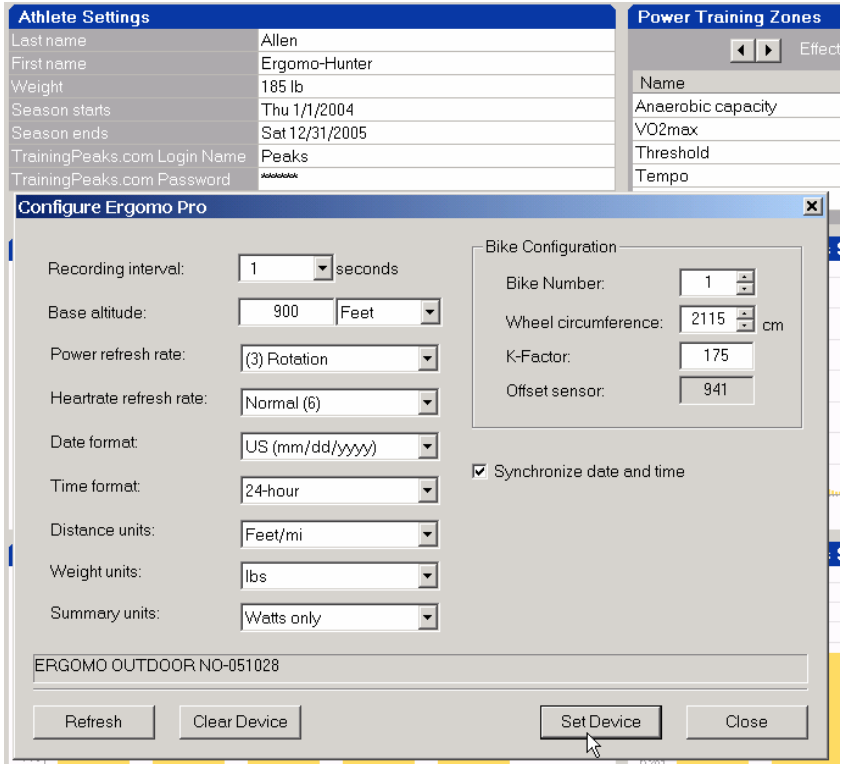
5.2. Configuration ergomo® computer

Connect the ergomo® pro computer to your serial cable and plug into a free serial port on your PC. Open ErgoRacer Software and select an athlete. Be sure you have the correct Power meter type (ergomo pro/spin) and Com port selected.



Push the button on the tool bar to 'Configure Device'. The middle one in the picture.

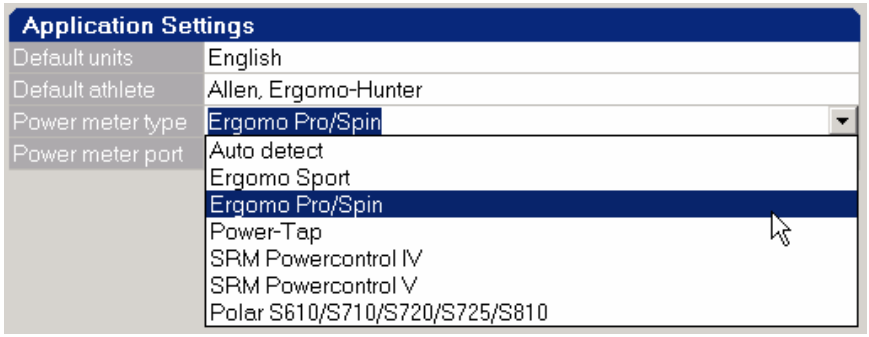
You will now see your "Configure ergomo® pro" screen and here you can change your settings.



You can adjust the settings of the ergomo® computer through pressing the "SET DEVICE" button. Your Weight and Threshold power will be automatically set up from the settings under your own personal "ATHLETE SETTINGS" in ergoRacer®.

5.3. Dowload from ergomo® computer

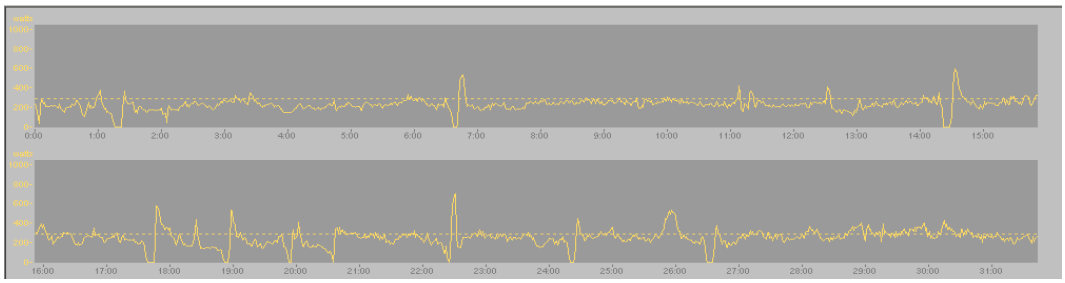
Connect the data transfer cable into a free serial plug-in of your PC and the ergomo® computer. Start the ergoRacer® Software on your PC. Once the software is loaded on your computer, you will need to create a new Athlete before can start. Click on "File" and select "Create New Athlete" and type in your personal information. If you do not know your Fitness data yet, give it a guess. You'll be able to edit this info easily later as you get your Fitness information. All fields must be entered. Under application settings be sure to select the right COM port in the "Power meter Por" box. You must have ergomo® pro/spin selected under "Power meter types".



Push the download icon on the screen in ergoRacer®. Next you will see the software downloading your ergomo® pro computer

Once your download is complete, you will see a box in the software that has your ride in it.

Double click on the ride information displayed and it will automatically import into the software as a new Ride. Or you can left click on the download and drag and drop into your Calendar on the correct day. Open the ride in the Calendar, by double clicking on the day, or if you just double clicked on the ride info, you will now see the graph of your ride with the Power line (yellow) drawn.



It is highly recommended that you read the user's guide under the "HELP" button on ergoRacer® software in order to help you further in the analysis of your ride.

6. Update

6.1. ergoRacer® software

Please look under www.ergomo.net in the folder service/downloads if there are new ergoRacer® software updates available. Please follow this installation guide in order to get your new ergoRacer® software started:

1. Step
- Close your ergoRacer® program

2. Step
- Download the ergoRacer® update

3. Step
- Unzip the file „ErgoRacer???.zip“. The resulting file is „ergoRacer.exe“

4. Step
- Copy the file „ergoRacer.exe“ into the folder of your ergoRacer® software (ergoRacer®) on your hard disk and overwrite the old „ergoRacer.exe“ file
- The ergoRacer® software is now ready to us

6.2. ergomo® firmware

Please look under www.ergomo.net in the folder service/downloads if there are new ergomo® firmware updates available. Please follow this installation guide in order to get your new ergomo® firmware started:

1. Step
- Download the ergomo® firmware update

2. Step
- Unzip file UPDATE_ERGOMO.zip“ and double-click the resulting file „UPDATE_ERGOMO.exe“ for installation (This is the ergomo® update-program)

3. Step
- Create a new folder on your hard disk and copy the ergomo® fimware-update(s) into this folder. These update files always have the file format .mot

4. Step
- Connect your ergomo® computer with your PC
- Open the ergomo® update-program that has been installed on your hard disk in step 1 (Double-click UPDATE_ERGOMO.exe“)
- Push the button „Update starten“ and select the ergomo® firmware update (stored in step 2)
- Wait until the update is finished and close the ergomo® update-program. Please keep the ergomo® connected with your PC

5. Step
- Start the ergoRacer® software and click the button „configure device" and select „clear device"
- After clearing the device (please follow the status in the footer) the new ergomo® firmware is ready for use. Please close all programs and disconnect your ergomo from your PC

7. Training with ergomo® Pro Power

The new ergomo® product series offers you innovatives tool to control and analyze your training. Using the “ergomo® Pro Power“ parameters Normalized Power (NP), Intensity Factor (IF) and Training Stress Score (TSS) you can manage your training and competition more effectively and efficiently. These parameters have been developed by exercise physiologist Andrew R. Coggan, Ph.D., and are exclusively presented in the ergomo® product series.

How do you use these innovative tools?
In order to use all the parameters of the ergomo® Pro Power you first have to set your personal threshold power in the menu settings (menu settings => training => threshold power) of your ergomo® computer.
Threshold power is the power at which the rate of lactate production continually exceeds the rate of lactate removal. Threshold power can be evaluated through lactate testing in a laboratory setting. Alternatively, your threshold power can be estimated as the average power that can be sustained during a maximum one hour effort.
Once this parameter is set in the menu settings your system is ready to show you all the parameters of ergomo® Pro Power during your rides.

What do these tools tell you?
ergomo® Normalized Power (NP)
NP is calculated using a special formula that both smooths and weights your power output to better reflect the physiological (especially metabolic) “costs” of variable-intensity efforts. The value of NP is shown in watts. While competing in an criterium, for example, your average power might be 200 watts, whereas the NP is 250 watts because of the frequent high intensity sprints after each corner.

ergomo® Intensity Factor (IF)
IF is the ratio of your NP to your threshold power, as defined above. Through IF you get a statement about the intensity of the effort relative to your own personal abilities. With help of the IF you can control and manage your training zones. For example you can monitor endurance fatburning as well as short and highly intense sprint intervals.

ergomo® Training Stress Score (TSS)
Finally, TSS gives you an indication of the overall “dose” of training resulting from your effort. TSS is a unit free number bigger than 1 and grows in relation to the riding time and intensity. By definition, a one hour threshold effort is equal to the TSS value of 100. Thus, TSS can be used quantify your overall training load. For example, when the TSS after a long endurance ride equals 100, the stress upon your body would be comparable to a one hour threshold ride.

8. Debugging

Display does not react on pressing a button

This requires a general reset of the ergomo®pro computer.

Under no circumstances perforate the socket for the pressure sensor. If you do the warranty is in validated.

NOT HERE! (pressure sensor)

This is the reset socket!

To perform a general reset, use the **reset button** on the reverse side of the ergomo® pro computers.

Never operate the reset button with a sharp object (Pin, etc.) as the rubber seal may be damaged. Use Paper clip or other blunt object!
Your ergomo® pro computer is ready to be used. NOTE: the re-set button does not delete the data stored in the ergomo®pro computer.

The ergomo® pro computer display is blank

The batteries need recharging. Plug the re-charger into the ergomo® pro computer as shown in 1.

The speed display is not functioning correctly

If the gap between the dry reed contact and the magnet is greater than 2mm, the ergomo® pro computer will not receive a signal from the dry reed contact. Please adjust the position of the two parts in relation to each other.

Display shows invalid power data

If pedals are used in reverse direction the ergomo® pro Computer may show invalid power data.

9. Technical data

	Accuracy	Range	Weight
Sensor	+ / - 1%	0 watt – 2,500 watts	Depending on model 270 g – 320 g

	Memory	Resolution	Weight	Display
Computer	approx. 12 h with 1 sec. intervals approx. 300 h for 30 sec. intervals	One data record / crank turn	90 g	- power - heart frequency - cadence - speed - altitude - temperature - stopclock - clock - TSS - IF - NP