USER'S MANUAL

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Package Contents

Be sure all items listed here were included with your ambiotex system.

- ambiotex TechUnit
- Micro USB charging cable
- User's Manual

For your Safety

To prevent damage to your ambiotex product or injury to yourself or to others, read the following safety precautions in their entirety before using this equipment. Keep these safety instructions where all those who use the product will read them.

The consequences that could result from failure to observe the precautions listed in this section are indicated by the following symbol:

This icon marks warnings. To prevent possible injury, read all warnings before using this ambiotex Product

Warnings

Turn of immediately in the event of malfunction

Should you notice smoke or an unusual smell coming from the device, unplug the USB charging cable or pull it off the shirt.

Do not disassemble

Touching the product's internal parts could result in injury. In the event of malfunction, the products should be repaired only by a qualified technician.

Do not use near pacemakers

The magnetic snaps may interfere with pacemakers. Please do not us the device, if you have a pacemaker.

Only use the TechUnit in the allowed temperature range of -10 °C to 50 °C

Do not use in presence of flammable gas

Do not use electronic equipment in the presence if flammable gas, as this could result in explosion or fire.

Do not leave the product where it will be exposed to extremely high temperatures(enclosed automobile or in direct sunlight)

Failure to observe this precaution could cause damage or fire.

Do not wear the TechUnit while it is connected with a USB cable

Failure to do so can result in injury.

Protect the TechUnit from rain and intensive moisture

Failure to observe this precaution could cause damage

Notices

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice for Customers in Canada and the U.S.A

This device complies with Part 15 of the FCC Rules and with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Notices for Customers in Europe

This symbol indicates that electrical equipment is to be collected separately.

The following apply only to users in European countries: This product is designated for separate collection at an appropriate collection point. Do not dispose of as household waste. Separate collection and recycling helps conserve natural resources and prevent negative consequences for human health and the environment that might result from incorrect disposal. For more information, contact the retailer or the local authorities in charge of waste management.

Introduction

Congratulations on your Ambiotex t-shirt!

The Ambiotex t-shirt will help to improve your personal training performance and will also help you to prevent overtraining. The performance diagnostic enables you to determine your individual running and cycling anaerobic threshold. The training zones resulting from your threshold are shown on the activity screen along with your current stress level.

These features ensure that you train in an optimal range at any time.

Intended purpose

The purpose of the Ambiotex system is to control the training and to analyze the function of the autonomic nervous system of (performance-orientated) athletes and people interested in health topics. Ambiotex is not a medical product and may therefore not be used for any diagnosis of disease.

Useful hints

If you have not performed physical activity or strenuous sports for some time, we recommend you to have your fitness checked by a physician first. Ambiotex does not evaluate your personal medical fitness. While your performance is being tested, your body will be strained until it reaches the point of subjective exhaustion. The test will be carried out at your own risk and should only be done after a previous medical fitness check-up.

Charging

Your ambiotex device should have shipped partially charged. To charge the TechUnit, use the enclosed USB cable to connect the device directly to your computer.

The ambiotex Shirt

The ambiotex Shirt has 2 sensor locations for the EKG readings and 1 respiration sensor around your chest

Washing instructions

Please machine wash your shirt at or below 40°C. Do not bleach, tumble dry or iron the shirt.

Always remove the TechUnit from the Shirt before washing.

The ambiotex TechUnit

1. USB Connector: Please use the USB Connector to charge the TechUnit with the enclosed Micro USB Charging cable.
2. Magnetic snap connectors: These connectors are used to attach the TechUnit to the Shirt. Please ensure proper connection between shirt and TechUnit before using it.
3. LED Button: The button is used to turn the TechUnit on and off. The LEDs behind the button indicate the status of the TechUnit.
    a. No flashing: TechUnit is turned off.
    b. Fast flashing green and red LEDs: TechUnit is in advertising mode and ready to be paired with your smart phone
    c. Green flashing: TechUnit is paired with a smart phone. You can turn the green flashing light off in the settings tab of your ambiotex app.

If you charge the TechUnit, the LEDs have the following meaning:

1. Red flashing LED every 2 seconds: Battery is charging
2. Constant green light: TechUnit has finished charging

To turn on the TechUnit, press the Button and release.

To turn the TechUnit of, press and hold the Button for 3 seconds. Then release the button.

First Steps

1. Downloading the app
    a. Please send your Apple-ID to contact@ambiotex.com
    b. Afterwards you will receive an invitation to TestFlight via e-mail. This program created by Apple allows conducting external tests by iOS Apps. We would like to fix any errors that may occur as soon as possible. This will be realized through TestFlight.
    c. Please download the TestFlight App from the Apple-Store as described in your invitation e-mail.
    d. Open TestFlight and install the ambiotex app.

2. Once you've opened TestFlight you will be asked if ambiotex may have access to your HealthKit data and if it should forward your activity data to HealthKit. This does not affect the app's function.

3. Connect the TechUnit (TU)
    a. Start the app; it will search for TUs available. (Fig. 1)
    b. Put the TU on the table right in front of you. Switch on the TU by pressing the yellow button on the front side. The LED should now be blinking.
    c. After a few seconds, the TU should be visible as shown on figure 2. In case you don't see any TU, please try to first switch Bluetooth off and then on your smartphone.

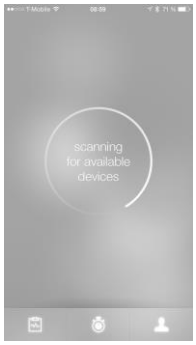


Figure 3

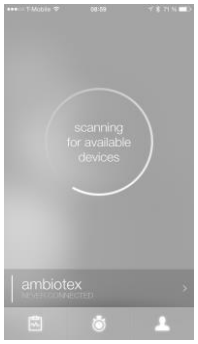


Figure 1

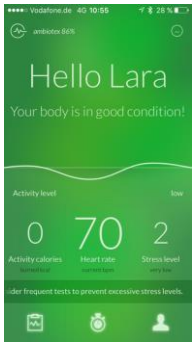


Figure 2

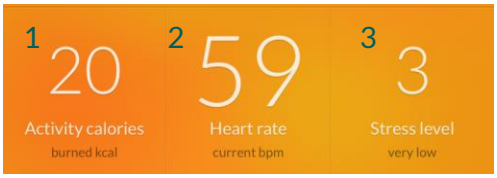
    d. Select the TU in the displayed list to get yourself connected with it. The next time this connection should be established automatically.
    e. Now you can see the start screen of the app (Fig. 3)
    f. The TU can be switched off again by pressing the button for 5 seconds, then letting go.

4. In order to determine your calorie consumption and your stress level precisely as possible, we ask you to store your personal data in the personal settings. You will need to click the symbol for personal settings which is placed on the lower right of the start screen. In the section „My profile" you will be asked to enter your personal information such as name, gender, age, height and resting pulse. If you're connected to the Apple HealthKit, some of the fields might have been filled in already. Now go back to the start screen.

Using the app

Put on the shirt and attach the TU to the magnetic connectors. Check if the TU is fitting well. Sometimes (this particularly applies to people with dry skin) it is necessary to moisten the sensors at the shirt with a drop of water first.

The following values are shown on the start screen:



1. Activity calories: Consumed calories while your activities were being recorded
2. Heart rate: After a few seconds the heart rate will be indicated here. The heart rate will be averaged over 10 seconds so the display does not appear unsteady.
3. Stress level: We show the stress level in a range of 1-10, whereby factors like age, daytime and gender are considered automatically. A low value corresponds to a minor stress level. For more detailed information please see section „heart rate variability".

On the lower edge of the start screen you can find the following control elements:

This button will lead you to the view of your personal activity history. The first view is showing the target achievement of the daily goal you've set (Fig. 4). With a swipe to the left, you can view your performance history. (Fig. 5).

On swiping bottom-up, you will be receiving an overview of your performed activities (Fig. 6). For more details please click the respective activity (Fig. 7).

Scroll down the detailed view to see elevation information and GPS track. You can also export your data as CSV file at the bottom of the view.

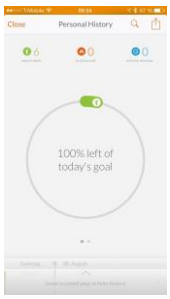


Figure 4

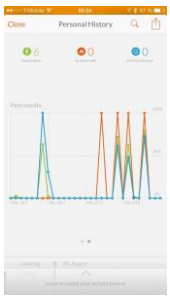


Figure 7

Figure 6

Figure 5

Clicking this symbol on the top right on the screen will enable you to export RR intervals on user-defined periods.

You can choose your activity by clicking the stopwatch symbol. You may select between outdoor and indoor activities and tests. The difference between outdoor and indoor activities is the registration of the GPS track. Choose your activity and start the registration by clicking the „start" button. Press „pause" in order to pause the activity and end or resume by clicking „stop" Activities must take at least one minute to be saved.

On clicking this symbol you can modify and save your individual settings, such as personal information. You can also switch off the blinking LED light at the TechUnit.

If you intend to have your data saved long-term, you must start an activity. Otherwise only parts of the data will be shown and registered.

Run a performance test

The activity button allows you to get to the performance tests in order to determine your individual anaerobic threshold while running or cycling. This threshold will be used to determine your personal training zones. It varies from individual to individual and also depends on the sport you're doing. The test is very useful if you decide to plan your exercises.

You either need a treadmill or a cycling ergometer to carry out the test. On selecting the test on your iPhone, you will see a screen showing an introduction to the test procedure. The test itself will be performed by means of voice-guided instructions. Please don't end the test before you are subjectively exhausted, i.e. you should feel like you can't keep your current level of efficiency during the next 3-minute phase. The test ends with a cool down phase. Finally, the result will be calculated by the app in order to determine your training zones. The test result can be viewed in the personal history.

The training zones in detail

We divide the heart rate in five zones:

1. Compensation range(KB)
   Training within the compensation range serves as an active recovery right after competitions or hard practice. The energy that is needed for the activity is mostly supplied through the process of fat metabolism. The performance intensity of these units is less than 50 per cent of the „individual anaerobic threshold".

2. Basic endurance 1 (GA1)
   Training within the compensation range serves as an active recovery right after competitions or hard practice. The energy that is needed for the activity is mostly supplied through the process of fat metabolism. The performance intensity of these units is less than 50 per cent of the „individual anaerobic threshold.

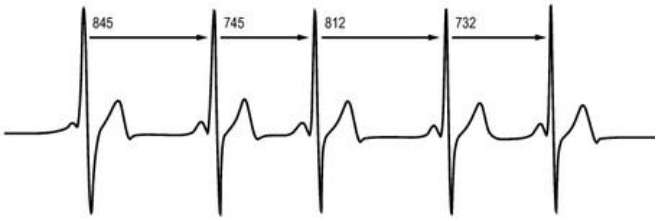
3. Basic endurance 2 (GA2)
   Training within the compensation range serves as an active recovery right after competitions or hard practice. The energy that is needed for the activity is mostly supplied through the process of fat metabolism. The performance intensity of these units is less than 50 per cent of the „individual anaerobic threshold.

4. Development range (EB)
   The DA optimizes and develops the aerobic-anaerobic transition area, the so-called threshold performance. Moreover the elimination of lactate will be improved. Particularly the carbohydrate metabolism will be required for this process. The heart rate is between 90 - 110% of the anaerobic threshold.

5. Peak performance (SB)
   Training to the peak performance helps develop competition-specific endurance and speed while also improving the maximum oxygen intake and the peak anaerobic performance capability. (VO2max). This is also known as the „lactic capacity test". This training targets the anaerobic metabolism by providing energy through carbohydrate and phosphate metabolism. The heart rate is 110% of the anaerobic threshold.

Heart rate variability

The interval of two heartbeats is usually determined by successive R waves, the so-called RR interval. At a closer look, you will notice that the duration of intervals normally differ in a millisecond range. (See next figure). The intervals' behavior determines the heart rate variability.



This irregularity is mainly caused by normal respiration. Try it yourself: Feel your pulse and take a deep, steady breath in and out. You will notice that while inhaling your heart rate is increasing, whereas on exhalation the heart rate is decreasing.

This capacity to adapt to the breathing rate is controlled by the vegetative or autonomic nervous system via parasympathetic and sympathetic activation. This system in our body is responsible for recovery and regeneration. If the sympathetic nervous system activates due to stress or over training, the heart rate will not change while breathing and the heart rate variability will decrease accordingly.

Our stress level particularly measures the parasympathetic activation and compares it to the reference values of people of the same age and same sex at similar daytime and under normal conditions. The stress level 5 applies to this reference value. In other words, achieving a value below 5 means that you are more relaxed than average, whereas achieving a value above 5 means that you are more stressed than average.

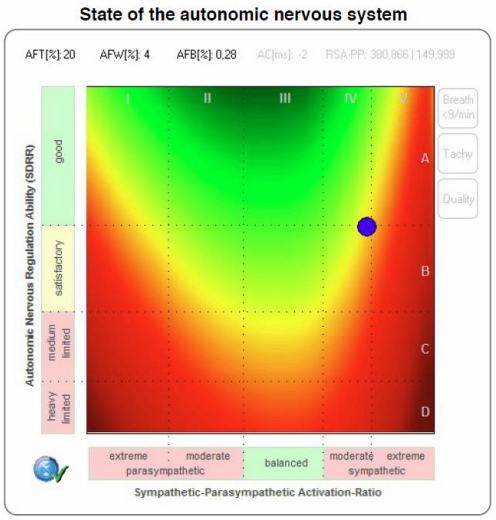
Please be aware, that your value will be added up within a 5-minute period. If you are standing up or walking during that period, the value will be changed due to your changing activity and the elevated pulse rate related to it. As a result, the calculation of your heart rate variability will be modified.

Stress-Test

The ambiotex stress-test takes 5 minutes 35 seconds and provides a quick overview of the current status of the autonomic nervous system. It will neither represent any medical diagnosis nor suggest any kind of therapy. Please ask your doctor for advice if you have concerns due to the test results. To start the test, please register your e-mail address in the profile so the test result can be sent to it as a pdf file. The test result contains the following components:

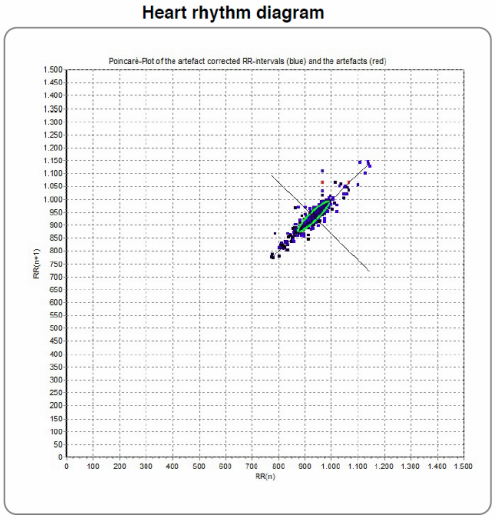
1. <u>Condition of the autonomic nervous system</u>

   The graphic shows a color-coded measurement result with regard to the sympathovagal balance (i.e. the balance between the sympathetic and the parasympathetic nervous system) as well as the autonomic adaptability (resistance to stress, physical fitness). The meaning of each axis can be found on the respective heading. The graphic provides a quick overview of the current and former results.



2. <u>Heart rhythm diagram</u>

   This image compares the time period of two successive RR intervals and can be interpreted as follows: The respective previous RR interval will be displayed in the x-axis and the current one in the y-axis. If a 910ms interval is succeeded by one of 825ms, then a data point will be displayed at 910ms on the RR-axis and a data point of 825 will be displayed on the RR+1-axis. Both of these numbers are defining a point in the diagram. The diagram allows drawing conclusions on the HRV.



3. <u>Written interpretation</u>

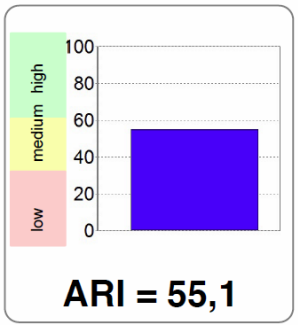
   In this section your measured values will be transmitted into a written form. The image below will give you an example:

Results
* Satisfactory autonomous nervous regulation ability in moderate sympathetic activation dominance (Zone B/IV).
* Sufficient adaptability of the ANS in changing environmental requirements.
* Activation level and emotional tension are increased.
* Relatively good psychic load capacity and physical stress resistance.

Risks
* The risk of autonomous nervous or stress related dysfunctions are slightly increased because of the sympathetic activation level.

4. <u>HRV-Parameter compared to control group</u>
   A multiplicity of statistically generated parameters is compared with reference data. . Each parameter is to be interpreted by medically trained staff only.

AR-Index



HRV parameter / Rank in statistic comparison group (n=12453)

Parameter	Value	Percentile	0	25	50	75	100
ØRR[bpm]	64,33	8,74	*				
SDRR[ms]	58,37	44,33			*		
RMSSD[ms]	22,56	51,18			*		
TP[ms²]	1352,6	22,32		*			
VLF[ms²]	1009,192	34,55			*		
LF[ms²]	299,998	12,83		*			
HF[ms²]	43,397	13,87		*			
LF/HF	6,913	51,09			*		
ln(LF/HF)	1,933	61,19				*	
AR-Index	55,14	50,16			*		

The following table gives you a survey of the parameters and their meaning

Parameter	Meaning
ØRR	Average heart rate over the whole measuring period of 5:35 min.
SDRR	Also called SDNN, standard deviation of the RR-intervals. The parameter represents the sympathetic and parasympathetic total activation over a measuring period of approx. 5 min.
RMSSD	The RMSSD (Root-Mean-Square of successive Differences) is currently the most popular and proven measure of the parasympathetic heart regulation.
TP	The TP (total power) parameter also represents the total status of the autonomic nervous system and highly correlates with the SDNN.
VLF	Very Low Frequency, is influenced by thermoregulatory and vasomotor processes.
LF	Low Frequency mainly describes the sympathetic influence on the heart rhythm regulation.
HF	High Frequency describes the parasympathetic influence on the regulation of the heart rhythm.
LF/HF	The LF/HF-ratio describes the sympathovagal balance of the autonomic nervous system and reveals shifts in the balance between the sympathetic and parasympathetic nervous system. .
Ln(LF/HF)	The natural logarithm of the previous LF/HF quotient.
AR-Index	Autonomic regulation index, i.e. health index of the autonomic nervous system. Developed by the ZNF research group.

Additional information

1. Offline Mode
   If the connection to your smart phone should suddenly be interrupted, the TU will keep on registering your activity data and buffer it internally. As soon as the connection has been re-established, the TU will transmit the missing data on your iPhone. This action may take some time due to the transmission rate of the BLE. For example: One hour of data may take up to 6 min. to transfer. The TU is able to buffer up to 24 hours of data.
2. Battery life of your iPhone
   On doing outdoor activities while using the TU, the runtime of your battery can be shortened considerably. This problem is mainly caused by the registration of the GPS coordinates. Before doing any kind of outdoor activities, always ensure that your battery is fully charged.

Questions & Answers (Troubleshooting)

Problem: The TU can't establish any connection
Solution: Sometimes it may occur that the TU is not being detected. The problem can be solved easily by switching the Bluetooth-connection on your iPhone on and off again and starting the TU anew.

Problem: The TU states, that it is connected, however it lost connection to the smart phone
Solution: In case of an Electrostatic Discharge (ESD), the TechUnit may get into an undefined mode. If that is the case, please reset the TechUnit manually (Press button for 3 seconds to turn it off, press button again for restart)

Problem: Where is the charge status of the TechUnit indicated?
Solution: The charge status of the TechUnit is shown on the home screen of the ambiotex app, i.e. on the upper left corner of the screen. The blinking LED light indicates that the TechUnit is switched on. It does not provide any information about the battery charge level.

Problem: The stress level is extremely low even though I am moving.
Solution: It takes 5 minutes to have the stress level determined. If you should have moved too excessively within this 5 minute-period, your heart rate has been increasing. The change of your heart rate will be affected by your breath. In this case the stress level cannot be determined accurately. Please sit down for 5 min. or just stand still and you will surely obtain a reasonable value.

Contact

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For further information please contact our support desk:

https://ambiotex.freshdesk.com

Or you can also get in touch with us via contact@ambiotex.com