



# POWER<sup>®</sup> breathe K SERIES

The world's 1st intelligent  
digital breathing trainer<sup>SM</sup>

User Manual English

WITH  
**BREATH+ELINK<sup>™</sup>**  
LIVE FEEDBACK SOFTWARE

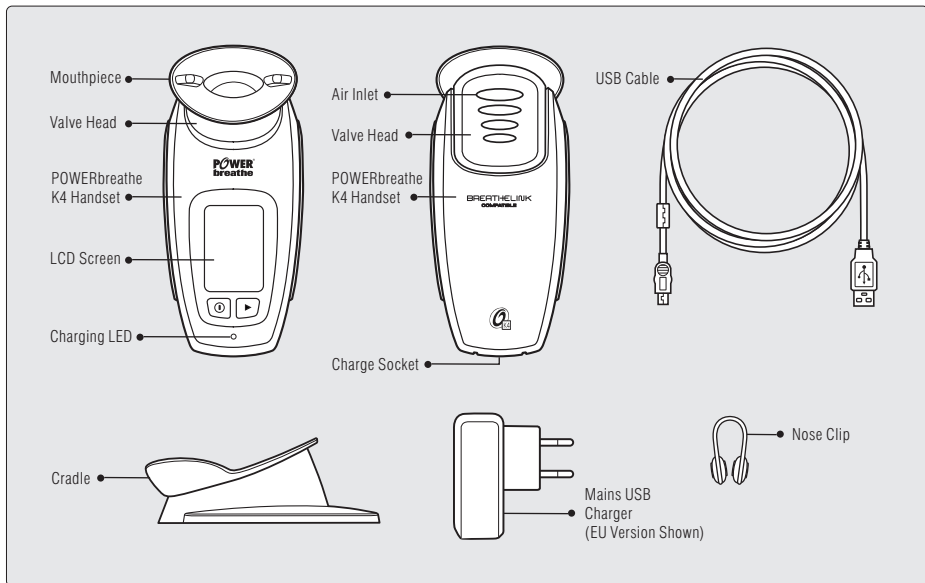




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# 1. Product Description



## 2. Introduction

Dear Customer,

Thank you for purchasing the POWERbreathe K4 electronic inspiratory-muscle trainer.

The POWERbreathe K4 will make your breathing muscles stronger, leading to reduced breathlessness during exercise or activity. This applies as much to committed athletes as it does to individuals with respiratory illnesses such as COPD (chronic obstructive pulmonary disease).

The POWERbreathe K4 uses an electronically controlled, rapid-response valve to create a resistance to inhalation. This strengthens the breathing muscles by making them work harder, in much the same way as you might use weights to increase the strength of your arm muscles. As you breathe through the POWERbreathe K4 you will notice that you gradually have to work harder to breathe in. This is the effect of resistance training acting on the muscles used to inhale (the diaphragm and ribcage muscles). When breathing out, there is no resistance and you can breathe out normally, allowing the chest and breathing muscles to relax, naturally pushing the air from your lungs.

The POWERbreathe K4 training resistance is specifically designed to match the dynamic changes in breathing muscle strength throughout your breath and can automatically adapt to increases in your inspiratory muscle strength at the beginning of each training session. Results are displayed on screen following a training or test session, or can be viewed 'live' using the Breathe-Link PC software supplied, allowing you to maximise your training performance.

The POWERbreathe K4 training regime of *30 breaths, twice a day* typically takes only a few minutes a day and, used properly, you should start to feel the benefits within just a few weeks. The POWERbreathe K4 can also be used to warm-up and cool-down the breathing muscles before and after exercise.

**To make sure you get the most from your POWERbreathe K4, please read this instruction booklet carefully and take time to get used to the exercises.**

### 3. Precautions



**The POWERbreathe K4 is suitable for almost anyone and will cause no harmful side effects when used properly. Please read the following precautions to ensure that you use your POWERbreathe K4 safely and appropriately.**

#### **Contraindications:**

Inspiratory muscle training, such as training with POWERbreathe, creates a negative pressure inside the chest, throat, ears and sinuses. You should not use POWERbreathe if you have any of the following:

- A history of spontaneous pneumothorax (a collapsed lung that was not due to traumatic injury e.g. broken rib)
- A collapsed lung due to a traumatic injury that has not healed fully
- A burst eardrum that has not healed fully, or any other condition of the eardrum
- Asthma with low symptom perception and suffer from frequent severe exacerbations
- Marked elevated left ventricular end-diastolic volume and pressure
- Worsening heart failure signs and symptoms after RMT / IMT
- If you have suffered from or are likely to suffer from Costochondritis.

Additionally, the following conditions have been highlighted to require guidance from a medical professional, before use of the POWERbreathe K-Series devices:

- Pulmonary hypertension
- Large bullae on chest x-ray
- Marked osteoporosis with history of rib fractures
- Desaturation during or following IMT (<94%)
- Patients who have undergone recent abdominal surgery and those with an abdominal hernia.

#### **Intended use:**

- The POWERbreathe K4 is designed for exercising your inspiratory muscles only. No other use is intended or implied
- This product is not intended to diagnose, monitor, treat, cure or prevent any disease
- The POWERbreathe K4 is not intended for use by persons with reduced physical, sensory or mental capabilities, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety
- Anyone who is under the age of 16 should only use the POWERbreathe K4 with supervision from an adult
- The POWERbreathe K4 contains small parts and is not suitable for children under 7 years

#### **Caution:**

- If you feel light headed or dizzy whilst training with POWERbreathe, slow down your rate of breathing or pause until you have fully recovered
- If you are suffering from a cold, sinusitis or respiratory tract infection, we advise that you do not use your POWERbreathe K4 until symptoms have disappeared
- Some users may experience slight ear discomfort when training with POWERbreathe, especially if they are recovering from a cold. This is caused by inadequate equalisation of pressure between the mouth and ears. If symptoms persist, please consult your doctor

- To prevent the potential transmission of infections, we recommend that you do not share your POWERbreathe K4 mouthpiece or valve head with other users, including family members
- Whilst training with POWERbreathe K4 you should feel resistance to inhalation, but it should not be painful. If you should feel pain whilst using the POWERbreathe K4, stop immediately and consult your doctor
- Do not make changes to any prescribed medication or prescribed treatment programme without consulting your doctor
- POWERbreathe is manufactured in a hygienic environment. However, POWERbreathe is not provided sterile – we recommend that you clean the mouthpiece prior to use
- Do not use the POWERbreathe K4 whilst taking part in other activities such as walking, running and driving
- If you have a pacemaker or other medical implant containing magnets or electronics, please consult with your doctor before using this product

***If you have any doubts about the suitability of POWERbreathe for you, or you have a medical condition, please consult your doctor.***

#### **Danger:**

- Only use the mains adapter supplied
- The adapter contains a transformer. Do not cut off the adapter to replace it with another plug as this causes a hazardous situation
- The adapter transforms the mains voltage (100-240Volts) to a safe voltage (5V)
- Make sure the adapter does not get wet
- Do not use a damaged adapter
- Always unplug your POWERbreathe before cleaning

#### **Electromagnetic Fields (EMF):**

The POWERbreathe K4 complies with medical standards regarding electromagnetic fields (EN 60601-1-2). If handled properly and according to the instructions in this user manual, the appliance is safe to use.

#### **Handling:**

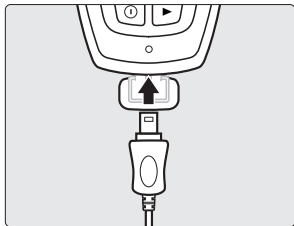
- Do not drop, disassemble, open, crush, bend, deform, puncture, shred, microwave, incinerate, paint or insert foreign objects into the POWERbreathe K4
- The POWERbreathe K4 Valve Head is designed for regular cleaning and disinfection (see section 11.1) in order to maintain hygiene and correct operation. However, the POWERbreathe K4 handset is not waterproof and should not be submerged or exposed to liquids

***If you suspect a defect has occurred, please contact your local customer service centre using the details listed in Section 17.***

## 4. Quick Start Guide

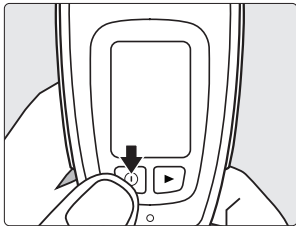


*The quick start section is provided for quick reference only. We recommend that you read the full manual before starting training for the first time.*





### 1. Recharge

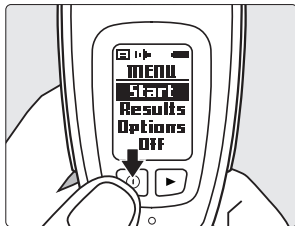
Plug in the mini-USB charger provided. Leave to charge fully for 16 hours – the red LED will switch off when the device is fully charged.




### 2. Power on

Press and hold the  button for approximately 1 second. Pause and wait for the **MENU** screen to appear.

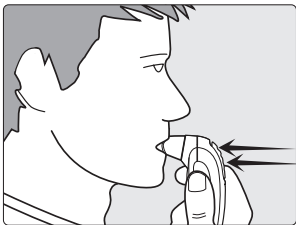
 *The first time you switch on the device you will be asked to enter your personal details before continuing*



### 3. Start the training mode

Ensure that the mouthpiece and valve head are located correctly on the handset, as shown in section 7.1. Press  from the **MENU** screen to select **Start**.

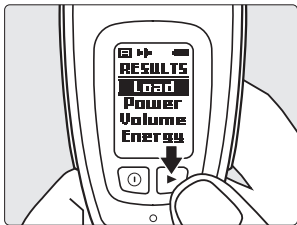




#### 4. Inhale as hard, as fast and as deep as possible

Inhale as quickly and as deeply as possible through the mouthpiece. Now breathe out slowly until your lungs feel completely empty then pause until you hear a beep (you may remove the POWERbreathe from your mouth during exhalation if you prefer). Repeat for 30 complete breaths.

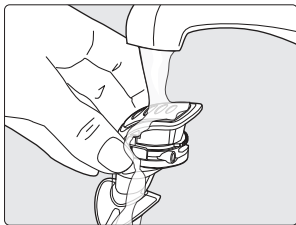
**i** See section 7.3 for detailed information on breathing technique



#### 5. View results

Once you have completed 30 breaths, the **RESULTS** (results) menu will automatically be displayed. Scroll between the different results options (**Load**, **Power**, **Volume**, **Energy**) using the ► button, then press **i** to view the highlighted result.

**i** See section 8.1 for detailed information on viewing training results



#### 6. Clean the valve head

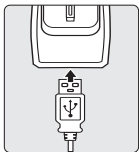
Once you have completed your training session, remove the valve head and soak it in warm water. Now rinse the valve head thoroughly under warm running water then leave on a clean towel to dry.

**i** See section 11.1 for detailed cleaning instructions

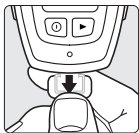
## 5. Basics

### 5.1 Charging

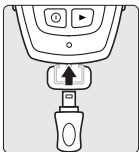
Remove the POWERbreathe K4 and power adapter from the packaging. For portable use, recharge your POWERbreathe K4 by following the instructions below. Alternatively, the POWERbreathe K4 may be used whilst connected to the mains using the power/charge adapter provided.



1. Plug the USB cable into the adapter and then plug the adapter into a suitable wall socket.



2. Pull out the charging socket cover from the base of the unit.



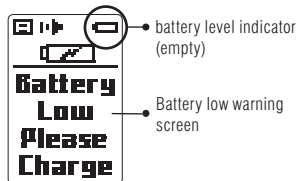
3. Plug the other end of the USB cable into the base of the unit. The red charging LED will switch on to indicate that the device is charging.

4. Once the red charging light has switched off (up to 16 hours), remove the power adapter from the wall socket and from the base of the unit. Now replace the charging socket cover in the base of the unit. Your POWERbreathe K4 is now ready for portable use.

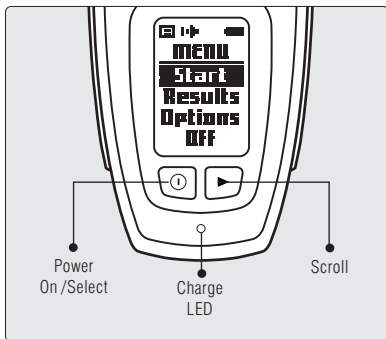
**i** The POWERbreathe K4 may also be charged from a PC or laptop using the USB to mini-USB adapter cable provided.

#### Battery low warning:

Recharge the battery again when the battery level indicator shows empty or when the battery low warning screen is displayed.



## 5.2 Buttons and Display Symbols



To switch on your POWERbreathe K4, press and hold the **⏻** button for 1 second or more. To turn off your POWERbreathe K4 scroll to the **OFF** option under the **MENU** screen using the **▶** button and select by pressing the **⏻** button. Alternatively, the POWERbreathe K4 will switch off automatically after 5 minutes of not being used.

### Display symbols:



Automatic Load Set-up



Manual Load Set-up



Button Sound On



Button Sound Off



Battery Fully Charged



Battery Empty



Mains Power Connected

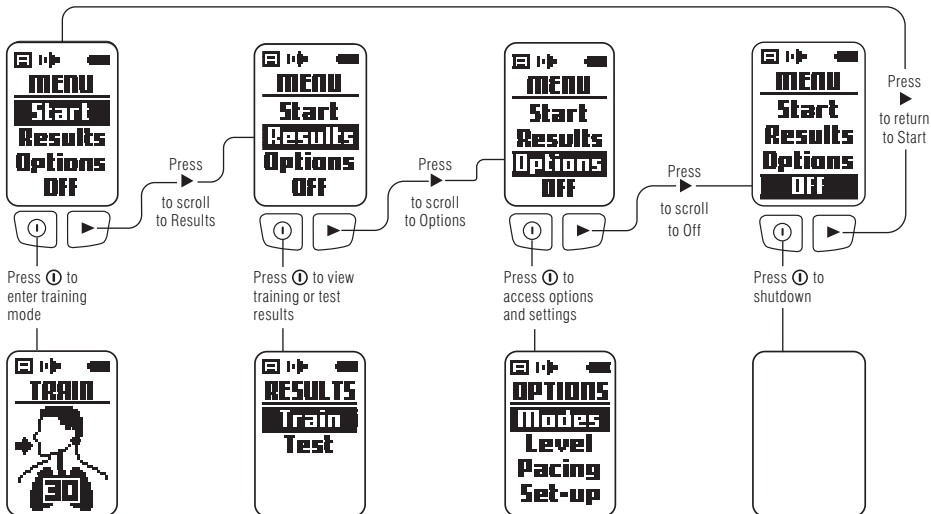


Number of breaths remaining  
in current breathing session

## 5.3 Menu System

POWERbreathe K4 uses an LCD menu system to navigate between different settings and to view training results.

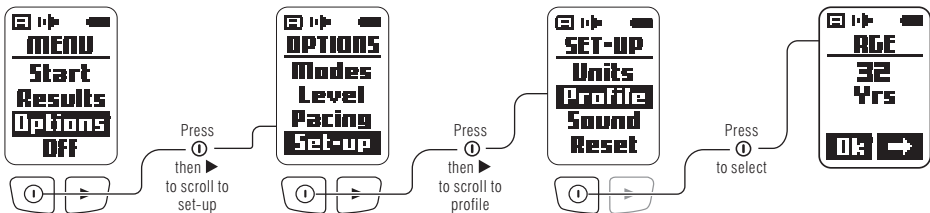
Use the ► button to move between different options and use the ⓘ button to select the highlighted option. Scroll past the last option within a screen using the ► button in order to return to the previous screen.



## 6. Before Training

### 6.1 Profile

When you turn-on your POWERbreathe K4 for the first time you will be prompted to enter the units of measurement (**UNITS**), your age (**AGE**), weight (**WEIGHT**), height (**HEIGHT**) and gender (**GENDER**). This information will be used to estimate your predicted inspiratory muscle strength and to provide feedback on your performance. This information can be edited at any time by selecting **Profile** under the **SET-UP** menu.



**i** Note: if you wish to change the units of measurement for your profile information, then select the **Units** option under the **SET-UP** menu then choose from **kg/cm** or **lbs/in**. This will not affect the units of measurement used for the results display.

### 6.2 Setting Training Load

The POWERbreathe K4 creates a resistance to inhalation (or load) that is equivalent to weight training for the muscles used to breathe (primarily the diaphragm and ribcage muscles). As with any other form of weight training, the POWERbreathe K4 resistance must be set at a level appropriate to the user in order to train these muscles effectively. For best training results, you should train at a level at which you feel you can only just complete the full session of 30 breaths. Training should feel hard – the more effort you put into your training, the greater the results you will achieve. The POWERbreathe K4 is equipped with two different methods for setting load: automatic (**Auto**) and user specified (**Manual**) set-up methods (see sections 6.3 and 6.4).


## 6.3 Automatic Set-up

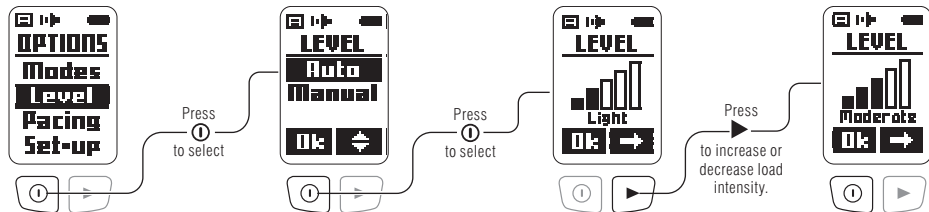


By default, the POWERbreathe K4 is set in the automatic set-up mode (indicated by the symbol ). When automatic set-up is selected, the device will automatically estimate your load requirements at the beginning of every training session. Using this method, the device will adjust the training load every time you start a new session and as the strength of your inspiratory muscles increases.

Automatic set-up of this load takes place during the first two breaths of each training session. During these breaths there is no load and you should breathe in as **quickly** and as **fully** as possible to ensure that the POWERbreathe K4 can measure your maximum breathing capability – see 'Breathing Technique' under the 'Training' section of this manual.

### Adjusting training intensity

When using the automatic set-up mode, you may find that the training load intensity is too high or too low, making it too hard or too easy for you to inhale through the device. To adjust the load intensity, navigate to the **LEVEL** screen by following the sequence below. Use the  button to increase or decrease the load intensity to an appropriate level. When in training mode, the load should be at a level at which you feel you can only just complete the full session of 30 breaths satisfactorily.



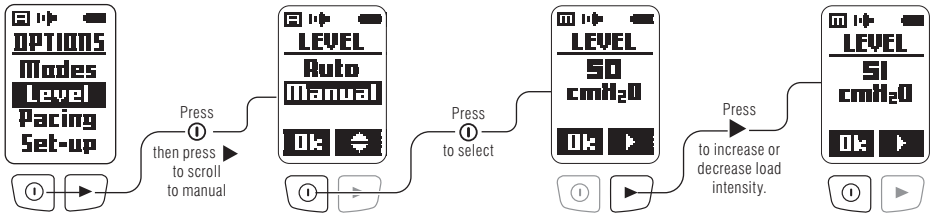
## 6.4 Manual Set-up



Manual set-up allows you to set the training load yourself and to adjust this load manually as your breathing muscles become stronger or as you feel necessary in order to maintain training intensity. Some users may prefer the greater control of load intensity that this method gives.

### Adjusting training intensity

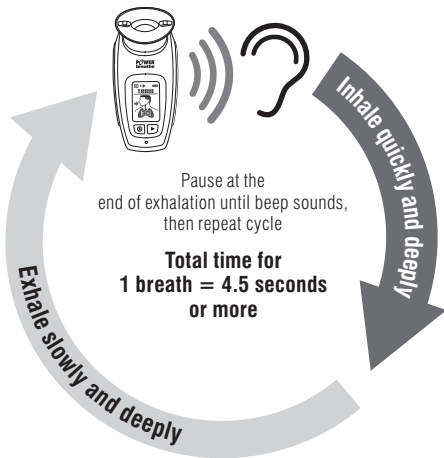
Once you have selected manual set-up mode you will need to enter the load at which you would like to train. In order to do this, navigate to the **LEVEL** screen by following the sequence below. Increase the training load by pressing the ► button (press and hold to scroll rapidly, scroll past the maximum of 200cmH<sub>2</sub>O to start again).



When using the manual set-up method it may take some time to find your ideal training level. Try gradually increasing the load by around 5 to 10cmH<sub>2</sub>O each time you train with the POWERbreathe until you reach a level at which you can only just complete a full session of 30 breaths. Over time, as your breathing muscles strengthen, you will find that it becomes easier to complete 30 breaths at this level. Each time this happens, increase the training level by about 5cmH<sub>2</sub>O to maintain the training intensity.

## 6.5 Pacing Your Breathing

**!** *This feature is for guidance only. If you feel dizzy or light-headed, try and slow down your breathing or stop and take a break. Equally, if you feel you cannot breathe slowly enough to hear the beep, simply breathe at a rate which feels appropriate to you.*



POWERbreathe is equipped with an adaptive pacing guidance feature, which is intended to guide the user to breathe at an appropriate rate (see also section 7.3 Breathing Technique). This is important in order to prevent dizziness from breathing too quickly (hyperventilation) during the breathing exercises.

Whilst breathing through the POWERbreathe during a training session, you will hear an audible beep, which sounds a minimum of 4.5 seconds after you start to inhale. Try to only start your next inhalation once you have heard the beep. The beep will not sound during inhalation or exhalation, only once you have completed your breath.

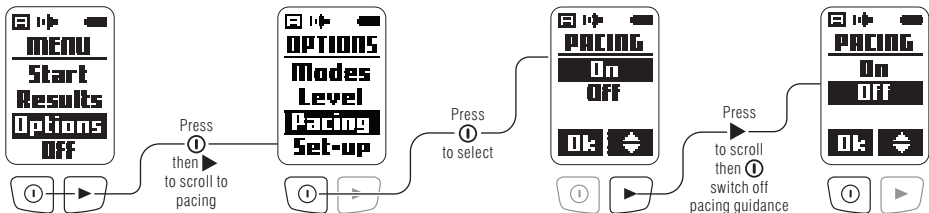
If you have taken longer than 4.5 seconds to complete a full breath, then the beep will sound as soon as you have finished breathing out. In this instance you can begin to breathe in again immediately. If you have taken less than 4.5 seconds to complete your breath, pause, holding your breath until you hear the beep, or until you feel the urge to breathe again, then begin to inhale. If you choose to breathe faster than 4.5 seconds per breath, then you will not hear the pacing beep.

Aim to always breathe in as **quickly** and as **deeply** as possible, but breathe out as **slowly** and **deeply** as possible so that the time between inhalations is long.



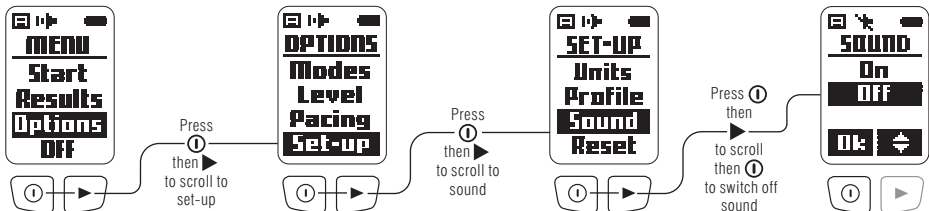
## 6.6 Disabling Pacing Guidance:

If you are happy to regulate your own breathing patterns during a training session you may wish to disable the pacing guidance feature. In order to do this, navigate to the **PACING** screen and select **OFF** by following the button sequence below:



## 6.7 Disabling Button Sounds

Button sounds may be disabled by navigating to the **SOUND** screen and selecting **OFF** by following the button sequence below:



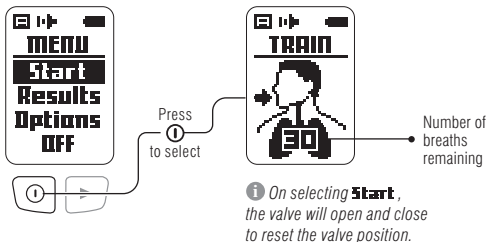
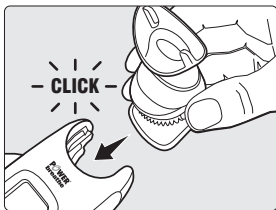
## 7. Training

When training with the POWERbreathe K4 you will feel a resistance to inhalation. This resistance is gradually introduced over the first five breaths of your breathing session, after which, the full training resistance is reached. During each breath, you may notice that the resistance is highest at the start of inhalation and gradually 'eases-off' as your lungs fill with air. This is the effect of the POWERbreathe K4 variable loading, which changes during the breath in order to match the changes in breathing muscle strength.

The recommended POWERbreathe training routine consists of *30 breaths, twice a day* (once in the morning and once in the evening). This adds up to about 5 to 10 minutes of training per day. Please follow steps 7.1 to 7.3 below to guide you through your training session.

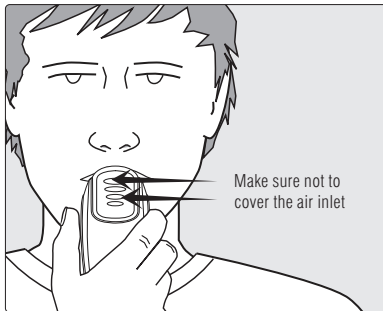
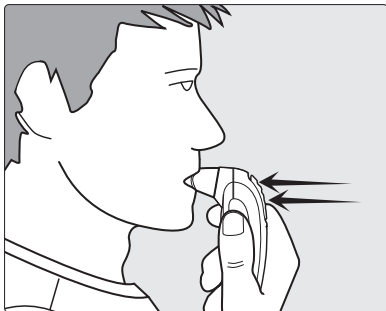
### 7.1 Starting a Training Session

To start a training session, ensure that the Valve Head is securely in position, then select **Start** from the main **MENU** screen.

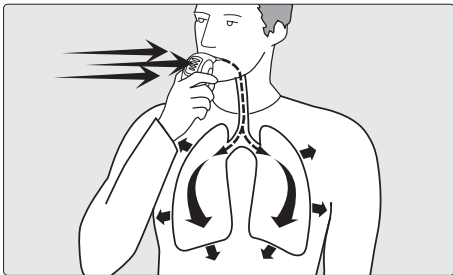


## 7.2 Holding the Device Correctly

Make sure you are standing or sitting upright and feel relaxed. Hold the device with your hand cupped around the lower rear section of the device, with your fingers and thumb on the coloured rubber grips. Make sure that your hand doesn't cover the air inlet. Now place the device in your mouth so that your lips cover the outer shield to make a seal and the mouthpiece bite blocks are gripped between your upper and lower teeth.



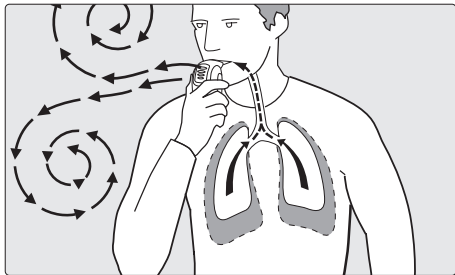
### 7.3 Breathing Technique



#### **Breathe in as hard, as fast and as deeply as possible**

Breathe out as far as you can, then take a **fast, forceful breath in** through the mouthpiece. Take in as much air as you can, as quickly as you can, straightening your back and expanding your chest as you inhale.

**i** *Inhalation is the portion of breathing during which training occurs. It is important to follow this breathing technique in order to benefit from improved breathing.*



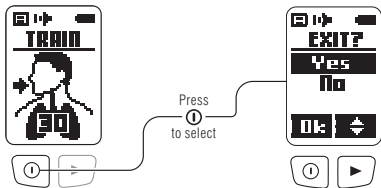
#### **Breathe out slowly**

Now breathe out **slowly and passively** through your mouth until your lungs feel completely empty, letting the muscles in your chest and shoulders relax. Pause until you hear the pacing beep (see section 6.5) or until you feel the urge to breathe in again. If it makes you feel more comfortable you can remove the unit from your mouth in order to breathe out, then return it to your mouth before you breathe in again.

**!** *It is important to breathe out slowly in order to prevent dizziness due to hyperventilation. If you start to feel light headed, slow down or take a break.*

Try to complete 30 breaths using the breathing method described. The first two breaths will feel easy, but as you continue to breathe in and out through the device you will find it gradually becomes harder to breathe in. This is the effect of the training resistance starting to increase.

The breathing exercises may take some getting used to and you may need to pause for a short rest. You may also wish to remove the POWERbreathe K4 from your mouth and check the number of breaths remaining in your training session on the display screen. To resume the training session, simply return the device to your mouth and start breathing again. To quit the training session, press **ⓘ** then select **Yes** by pressing the **ⓘ** button again. Once you have completed 30 breaths the POWERbreathe K4 will beep to indicate the end of the session and the valve will open.



Breathing against the training load should be challenging, but not painful. In order to achieve the maximum training benefits, it is important that this load is set at a level appropriate for your personal training requirements (see section 6.2). It is also important to use the correct breathing technique to maximise the training effects and to prevent dizziness due to hyperventilation.

## 7.4 Using the Nose-clip

POWERbreathe is provided with a nose-clip to help you to breathe through your mouth rather than your nose. However, it is not essential and some people find it more comfortable to train without the nose-clip or to pinch their nose with their fingers.



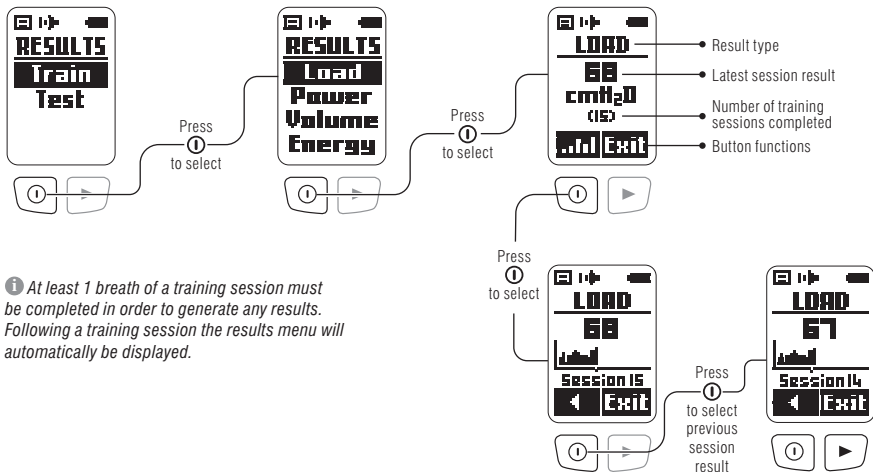
## 7.5 Maintaining Your Breathing

After four to six weeks of training for 30 breaths, twice a day, your breathing muscles should have improved substantially and you should feel less breathless during activity (see section 14). At this stage you will not need to use your POWERbreathe K4 every day to maintain your improved breathing. Using your POWERbreathe K4 twice every other day will be sufficient to continue to enjoy a better lifestyle and improved performance.

## 8. After Training

### 8.1 Viewing Training Results

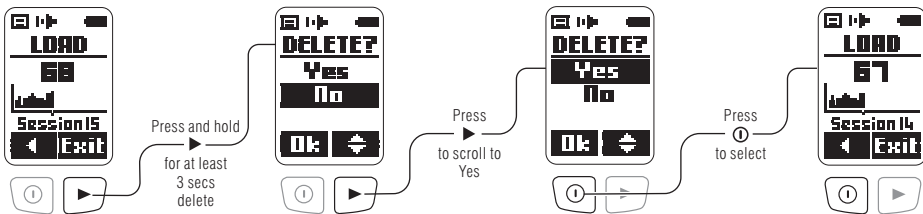
The POWERbreathe K4 Results system provides feedback on your respiratory training sessions. Using these results you can monitor your training progress, allowing you to optimise your training sessions and to meet your training targets. To view training results, select **Train** from the **RESULTS** menu then select from **Load**, **Power**, **Volume** or **Energy**



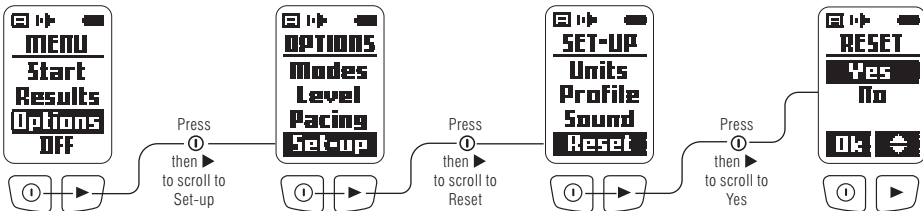
**i** At least 1 breath of a training session must be completed in order to generate any results. Following a training session the results menu will automatically be displayed.

## 8.2 Deleting training session results

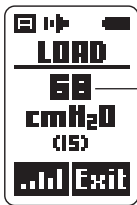
Individual training session results may be deleted whilst in the graphical results display screen. Scroll to the session number that you wish to delete using the **1** button, press and hold the **▶** button for at least 3 seconds then select **Yes** to delete the results for that session.



In order to clear all training results from memory and to reset all other device settings, select **Reset** from the **SET-UP** menu as demonstrated below.



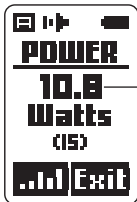
### 8.3 About the Training Results



Highest Load achieved during latest session

**LOAD (LOAD)** is a measure of the resistance to inhalation and is equivalent to the 'weight lifted' or force exerted by the inspiratory muscles. Load is measured in units of cmH<sub>2</sub>O, a unit of pressure commonly used in respiratory medicine to represent the pressure generated in the lungs due to the force of the inspiratory muscles. The load displayed corresponds to the highest training load achieved during your breathing training session. A higher load result means that you are training your inspiratory muscles harder, leading to stronger muscles. Stronger inspiratory muscles will need to work less hard to cope with the demands of breathing, leading to reduced breathlessness.

**i** When training using the automatic set-up method, load is based upon your estimated inspiratory muscle strength. This is measured each time you complete a new training session and should reflect improvements in your inspiratory muscle strength. When using the manual set-up method, load is based upon the level entered by you. In this case, load displayed will track the increases in load that you manually enter via the level setting screen.



Average power during latest session

**POWER (POWER)** is a measure of muscle performance which combines strength and speed of movement. More powerful muscles will be more resistant to fatigue at a given level of work and therefore, breathlessness will be reduced. More powerful muscles will also be able to generate higher airflow and may increase the body's ability to neutralise lactic acid during heavy exercise. The value displayed is the average power for all breaths in a training session.

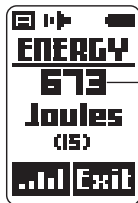
**i** In order to maximise your inspiratory muscle power result, try to breathe in as quickly as possible. Remember to always breathe out slowly, so as not to hyperventilate.





Average volume inhaled per breath during latest session

**VOLUME (VOLUME)** indicates the average amount of air inhaled per breath during a training session. A higher value of volume indicates that you are breathing deeply and training the inspiratory muscles across their full range of movement. Try to inhale as deeply as possible for each breath of the training session in order to maximise this value. A relatively small value of volume may indicate that you are training at a level that is too high and are unable to properly complete each breath.



Breathing energy achieved during latest session

**ENERGY (BREATHING ENERGY)** is a measure of the mechanical work (or effort) of breathing during your breathing training session. It is a result which combines the force exerted by your inspiratory muscles and the volume of air inhaled. The higher the value of breathing energy you attain, the longer and harder you have worked your inspiratory muscles.

**i** *In order to maximise the breathing energy achieved during a training session, ensure that you breathe against the highest load that you can manage and that you breathe in as deeply as possible during each breath of the entire session.*

### Monitoring the changes

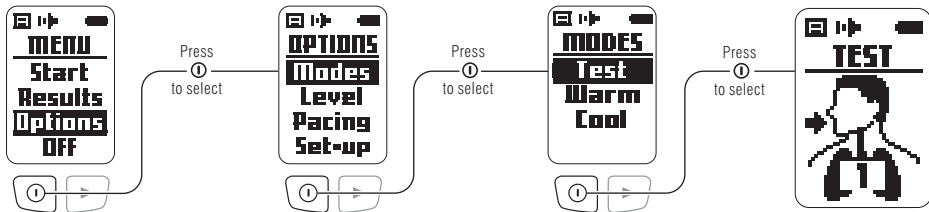
By monitoring the changes in load, power, volume and energy over a period of days and weeks, you can observe the progress of your training. Do not expect instant results – as with any training, it will take time to see the improvements. Do not be disheartened if your training results fluctuate from day to day, this is normal and it is an overall trend of improvement that is important.

## 9. Modes

In addition to training mode, the POWERbreathe K4 is equipped with three different breathing modes, which can be accessed via the **OPTIONS** menu.

### 9.1 Test Mode

The POWERbreathe K4 test mode can be used to quickly assess your respiratory muscle performance at any time. When test mode (**Test**) is selected, you will be prompted to perform one, unloaded breath through the POWERbreathe K4.



To perform the test, breathe out as far as you can until your lungs are completely empty. Now place the mouthpiece into your mouth and inhale as **hard**, as **fast** and as **deeply** as possible until your lungs are completely full.

Once you have completed the breath, the POWERbreathe K4 will beep to indicate that the test is complete and you can remove the POWERbreathe K4 from your mouth. The test results menu will automatically be displayed once you have completed the test. Use the ► and [power button] buttons to scroll between and view your **5-Index** (Strength Index), **Flow** or **Volume** result.

## 9.2 About the Test Results:

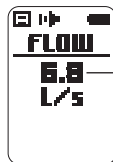


Strength Index

Strength Index rating

**S-INDEX** (Strength index) is a measure of your inspiratory muscle strength. Your strength index result is rated (V. Poor to Excellent) based upon predicted normal values of inspiratory muscle strength for an individual of your age, height, weight and gender. This is calculated using the profile data (section 6.1). As you continue to train your inspiratory muscles over a period of weeks you should see improvements in your S-Index result.

**i** *Strength index rating compares your inspiratory muscle strength with that of an average individual based upon research. However, inspiratory muscle strength varies widely between individuals. A poor rating for your strength index does not necessarily indicate a problem, and similarly a good strength index value does not indicate that you will not benefit from training your inspiratory muscles.*



Peak inspiratory flow from test breath

**FLOW** (Flow) is a measure of the maximum rate at which you can inhale air into your lungs. The measurement is based upon the maximum measured flow rate during the test breath. This measurement gives an indication of the speed at which your inspiratory muscles can contract. As you continue to train your inspiratory muscles over a period of weeks you should see improvements in your Flow result.



Volume of air inhaled during test breath

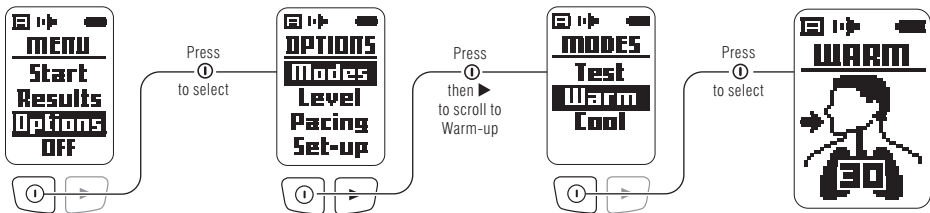
**VOLUME** (Volume) is a measure of the amount of air inhaled during the test breath. For some individuals with pronounced inspiratory muscle weakness, training the inspiratory muscles may allow a greater volume of air to be inhaled. For most individuals, this result will not change significantly following training. However, this result is useful to compare with your training volume result in order to identify whether you have inhaled as deeply as possible throughout your training session.

### 9.3 Warm-up Mode

Research has shown that a normal pre-exercise warm-up routine neglects to warm-up the breathing muscles, leading to excessive breathlessness during the start of exercise. The POWERbreathe K4 can be used to specifically warm-up these muscles prior to exercise using a reduced load setting leading to improved exercise performance.

The POWERbreathe K4 warm-up session consists of 30 breaths at approximately 80% of your normal training intensity and should be completed twice with a two minute rest between sessions. These exercises should be completed around five to ten minutes prior to starting your workout, training or competition.

Select **Warm** from the **MODES** menu to begin an inspiratory muscle warm-up session. The load for your warm-up session will be automatically set at a proportion of your normal training level. Follow the same breathing technique as described in section 7.3.

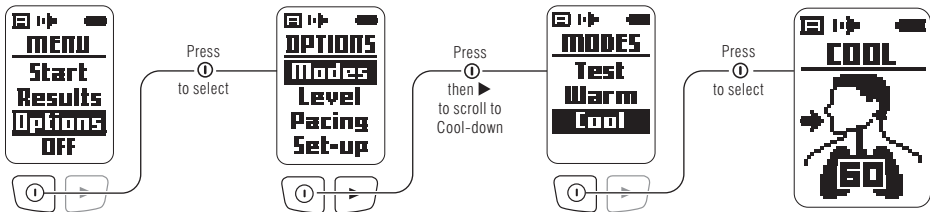


**i** No results are displayed following a warm-up session

## 9.4 Cool-down Mode

During exercise, lactic acid accumulates in the tissues and blood, leading to discomfort and muscle fatigue. Research shows that breathing against a light resistance following exercise reduces lactic acid more rapidly (by up to 16%), aiding recovery and enhancing performance during subsequent exercise..

The POWERbreathe K4 cool-down session consists of 60 breaths against a low level load. Select **Cool** from the **MODES** menu to begin an inspiratory muscle cool-down session. Breathe in and out slowly and deeply during the cool-down session until you have completed 60 breaths.

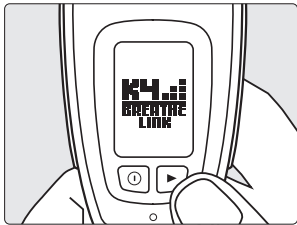
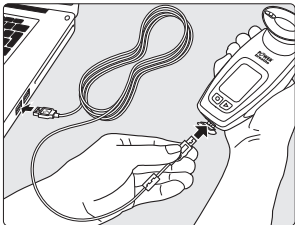


**i** No results are displayed following a cool-down session

## 10. PC Connection and Software Installation

The POWERbreathe K4 Breathe-Link software allows you to view live training and test data and record your training progress. Please follow the instructions below to install the software and connect your POWERbreathe K4.

- Follow the instructions on your computer screen to install the software.
- Once software installation is complete, plug the large connector of the USB cable into an available USB port on your computer.
- Plug the mini-USB connector (small connector) into your POWERbreathe K4 unit.
- Wait for a few seconds, so that the USB drivers can initiate connection to your POWERbreathe K4.
- Manually launch the Breathe-Link application from your desktop icon, your POWERbreathe K4 unit should display the Breathe-Link screen.



# 11. Care and Maintenance

POWERbreathe K4 is designed to be as robust and durable as possible. With a little care, your POWERbreathe K4 should last a long time. Please read the following precautions to ensure that your POWERbreathe K4 remains in top condition:

## 11.1 Cleaning

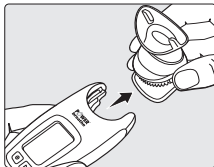
Your POWERbreathe K4 will be exposed to saliva during use. It is important that you clean it frequently to keep it hygienic and in good working order.

### Regular cleaning

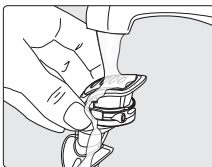
After each training session, remove the valve head from your POWERbreathe K4, as demonstrated right, and soak it in warm water for about ten minutes. Now hold the valve head under warm running water whilst opening and closing the valve to aid cleaning of the valve surfaces. Shake off excess water and leave on a clean towel to dry.

Wipe-clean the POWERbreathe handset with a damp cloth. Do not immerse the handset or expose it to running water as this may damage the internal electronics.

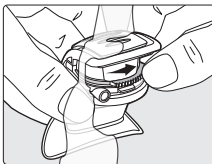
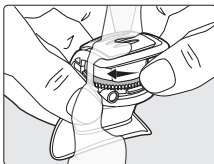
### Removing the valve head



### Rinsing the valve head




### Rotating the valve to aid cleaning



### Once a week

Once a week, perform the same procedure but soak the valve head in a mild disinfectant solution instead of water. The disinfectant solution used must be intended for use on equipment that comes into contact with the mouth, such as the POWERbreathe cleansing tablets or fluid. If in doubt, ask your pharmacist or check the POWERbreathe website for further information.

After cleaning, hold the valve head under a running tap allowing water to run through it. Shake off excess water and leave on a clean towel to dry.

 **Never use scouring pads, abrasive cleaning agents or aggressive liquids such as petrol or acetone to clean the appliance. The POWERbreathe K4 is not suitable for dishwasher use.**

## 11.2 Blocked Valve Head



If the valve head becomes clogged with dirt or saliva then the POWERbreathe unit cannot function correctly and an error message may be displayed. When this happens, you should follow the cleaning instructions detailed in section 11.1.

### Replacement valve head

For maximum training performance, we recommend that you replace the valve head every six months.

## 11.3 Storage

Please store your POWERbreathe K4 at a temperature between  $-10^{\circ}\text{C}$  and  $60^{\circ}\text{C}$ . Please store your POWERbreathe K4 in the storage pouch provided or a suitable clean and hygienic container. Always make sure that your POWERbreathe K4 is dry before storage.

## 11.4 Calibration

The POWERbreathe K4 should be recalibrated once a year in order to ensure its continued accuracy. Please contact the manufacturer using the details at the end of this manual for further information on this procedure.



## 12. Technical Specifications

Load display:	5 to 200cmH <sub>2</sub> O
Training session counter:	up to 999 sessions
Graphical load display:	Last 36 sessions
Power display:	0 to 99.9 Watts
Graphical power display:	Last 36 sessions
Volume display (Training):	0 to 8 Litres*
Graphical volume display:	Last 36 sessions
Energy display:	0 to 9999 Joules
Graphical energy display:	Last 36 sessions
Strength index display:	0 to 240cmH <sub>2</sub> O
Strength index rating:	V. Poor, Poor, Fair, Average, Good, V.Good Excellent
Flow:	0 to 13L/s*
Volume display (Test):	0 to 8 Litres*
Accuracy:	Pressure: ±3% Flow: ±10% Volume: ±10%
Resolution:	Pressure: 1cmH <sub>2</sub> O Flow: 0.1L/s Volume: 0.1L
Sounds:	Scroll/Select; Pacing; Low battery; End of training session
Buttons:	1 x select/on, 1 x scroll
Charging:	5V dc mains adapter
Charge time:	Up to 16 hours

Charge indicator:	Red LED during charging
Battery Life:	Approx 60mins in training mode
Battery:	3x AAA NiMH rechargeable battery pack
Dimensions (Handset):	130 x 58 x 70mm
Weight (Handset):	136g
Storage temperature:	-10°C to 60°C
Operating temperature:	5°C to 40°C
Safety:	EN 60601-1, EN 60601-1-2
Regulatory:	Class I Medical Device

\*Measured at atmospheric temperature and pressure conditions

## Materials:

Mouthpiece:.....	Thermoplastic elastomers (TPE)
Soft-touch grips and seals: .....	TPE
Screen cover:.....	PMMA
Buttons: .....	PC
Stand: .....	PC-ABS
Gears: .....	Acetal
Valve Rotor: .....	PBT (PTFE filled)
Valve Stator: .....	Acetal (PTFE filled)
O-ring: .....	Nitrile rubber
Nose-clip rubber: .....	Silicone 40
Nose-clip bridge:.....	Nylon
All other components: .....	PC-ABS

## Available POWERbreathe Accessories:

- Additional Valve Heads
- Cleansing Tablets
- POWERbreathe TrySafe Bacterial/Viral Filter
- Filter Adapter
- Face Mask

## Symbols:



This symbol indicates that this is a Class 1 medical device



The UKCA (UK Conformity Assessed) marking is a UK product marking that is used for goods being placed on the market in Great Britain (England, Wales and Scotland).



This symbol indicates that this device should not be disposed of with normal household waste



Consult accompanying documents



Precedes the batch number of the device.

## 13. Disposal

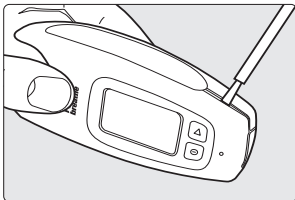


### Environment:

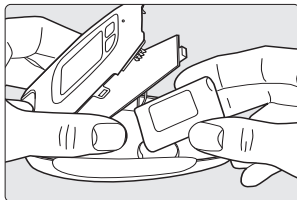
The use of the crossed out wheeled bin symbol on this product indicates that it should not be treated as household waste. Please help to preserve the environment by disposing of this product at a designated WEEE collection facility. For more detailed information on recycling of waste electrical and electronic equipment, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

### Disposal of the battery:

The built-in, rechargeable POWERbreathe battery pack contains substances that may pollute the environment. Please remove the battery pack as described below before you discard the product at an official collection point. Dispose of the batteries separately at a battery recycling point.



*Insert a screwdriver between the two halves of the main casing and twist until the two halves break apart.*



*Push apart the two clips retaining the circuit board and lift the battery out from underneath the circuit board*

**!** *Only remove the battery when you discard the POWERbreathe K4. Make sure the battery is completely discharged when you remove it.*

## 14. About Inspiratory Muscle Training

### What is respiration?

Respiration, or breathing, is the process by which air flows into and out of the lungs, and gases are exchanged between the lungs and blood. During the inspiratory portion of breathing, the diaphragm contracts, pushing down and increasing the volume of the chest cavity. Simultaneously, the muscles of the ribcage contract, pulling the ribs upwards and outwards, expanding the chest and drawing air into the lungs. During expiration the inspiratory muscles of the diaphragm and ribcage relax and the elasticity of the lungs and chest naturally push air out from the lungs.

### What affects our breathing?

Rate and depth of breathing is affected by a number of factors including levels of carbon dioxide, oxygen and metabolic by-products in the blood, and by consciously induced changes. During exercise, rising levels of blood carbon dioxide and falling blood oxygen due to increased metabolic activity, rapidly stimulate an increase in respiration from as low as 10Litres/min to as high as 220Litres/min. This increase in respiration may occur at very low levels of exercise in individuals whose breathing is impaired (e.g. through respiratory illness).

### What is breathlessness?

As the respiratory muscles work harder to breathe faster and deeper in order to meet metabolic demands, they begin to fatigue. In response to fatigue of the inspiratory muscles, the brain creates

a sensation of discomfort, which prompts us to rest, allowing the respiratory muscles to recover before they become so fatigued that they can no longer function. This sensation is called breathlessness and is a major factor contributing to exhaustion and exercise limitation.

### Are there any other effects of inspiratory muscle fatigue?

In response to inspiratory muscle fatigue, the body also diverts blood from other exercising muscles to the respiratory muscles. This aids functioning of the respiratory muscles but hinders the other muscles, which are starved of blood and therefore less able to perform. This also leads to exercise limitation.

### What is inspiratory muscle training?

As with any other muscle, respiratory muscles can be trained so that they are more resistant to fatigue. This resistance to fatigue results in reduced breathlessness and enhanced exercise tolerance.

The POWERbreathe K4 uses the principle of resistance training to train the inspiratory muscles. It creates a resistance to inhalation, forcing the breathing muscles to work harder to draw air into the lungs. This trains the muscles in much the same way as dumbbells might be used to train the bicep muscles.

## 15. Troubleshooting and FAQs

1. When in Auto set-up mode, the device doesn't seem to give me a very high load and breathing seems very easy.
2. There is too much resistance to inhalation and I am unable to breathe through the device.
3. The POWERbreathe K4 will not switch on.
4. The POWERbreathe K4 is switched on but will not respond to any button presses.
5. The mouthpiece has become discoloured or cloudy.
6. The exercises cause me to create a lot of saliva – is there anything I can do to stop this?
7. I have cleaned the valve head but I still see the Error 'Please Clean Valve' message.
8. How often should I clean the valve head?
9. There doesn't seem to be any resistance to breathing until I have already completed several breaths.
10. I can't hear the pacing buzzer
11. How hard should the training feel?
12. My results vary a lot, is this normal?
13. The load seems to disappear towards the end of the breath, is this right?
14. Does the volume displayed correspond to my lung capacity?
15. What are  $\text{cmH}_2\text{O}$ ?
16. How is strength Index calculated?
17. Can more than one person use the same POWERbreathe K4 unit?
18. What if I don't see any improvements?
19. What happens if I cough during a breath?

### **1. When in Auto set-up mode, the device doesn't seem to give me a very high load and breathing seems very easy.**

When using Auto set-up mode to set your training resistance, the POWERbreathe K4 sets your training load based upon the speed and depth of your inhalation during the first two breaths of the session. The harder you inhale during these breaths, the higher the load that will be set. If you are putting maximum effort into your inhalation but are still not experiencing a significant load, try adjusting the intensity level as described in section 6.3

### **2. There is too much resistance to inhalation and I am unable to breathe through the device.**

If you feel unable to inhale through the POWERbreathe K4, remove the valve head and check that the valve can open and close freely. If necessary, clean the valve head as described in section 11.1. Now re-attach the valve head to the handset, ensuring that it is properly seated. Check the load settings as detailed in section 6.2 and then restart your training session.

### **3. The POWERbreathe K4 will not switch on.**

If your POWERbreathe K4 will not switch on, the battery may be completely flat. You may use the device immediately by plugging into the mains using the adapter and USB cable supplied. Alternatively, recharge the device as detailed in section 5.1.

**4. The POWERbreathe K4 is switched on but will not respond to any button presses.**

Press and hold the **⓪** and **▶** buttons simultaneously for at least 3 seconds then release. This will reset and switch off the device (no data will be lost). Now press the **⓪** button for approximately one second to switch the device on again.

**5. The mouthpiece has become discoloured or cloudy.**

When the mouthpiece is soaked in water or cleansing solution for a prolonged period of time, a small amount of moisture may be absorbed by the material, leading to cloudiness or discolouration. If this occurs, leave the mouthpiece to dry on a clean towel and the cloudiness will gradually disappear.

**6. The exercises cause me to create a lot of saliva – is there anything I can do to stop this?**

If you find that you are producing excess saliva during training try pausing during your training in order to allow saliva in your mouth to clear. Alternatively, you may find that taking the unit out from your mouth during exhalation may reduce the build up of saliva. This will not reduce the training effect that occurs during inhalation.

**7. I have cleaned the valve head but I still see the 'Error Please Clean Valve' message.**

In some circumstances the valve head may become very clogged with dirt or saliva. Make sure that you soak the valve head thoroughly and rotate the valve back and forth to dislodge any dirt or debris trapped in the valve. When you reattach the valve head, ensure that it is properly seated on the handset so that no gaps are visible.

**8. How often should I clean the valve head?**

The valve head should be cleaned after every training session in order to maintain hygiene and effective operation.

**9. There doesn't seem to be any resistance to breathing until I have already completed several breaths.**

During the first two breaths of every training session, the POWERbreathe K4 is taking measurements of your breathing. During these two breaths there is no resistance. During the third and fourth breaths, training resistance (load) is gradually introduced until full training load is achieved for breath 5 and onwards.

**10. I can't hear the pacing buzzer**

If you take less than 4.5 seconds per breath then you will not hear the pacing buzzer. After breathing out you must pause in order to hear the pacing buzzer (see section 6.5).

**11. How hard should the training feel?**

Training with the POWERbreathe K4 is a form of resistance training and may be compared to training with weights in the gym. Inhaling against the training resistance should feel hard and for the best training results you should aim to breathe against a load at which you can only just complete 30 breaths. Like any other training, the more effort you put into your POWERbreathe training, the greater the results you will achieve.

**12. My results vary a lot, is this normal?**

The action of breathing is by its very nature extremely variable and difficult to control accurately. When you first start training with

the POWERbreathe K4, you may find that your results vary widely between different training sessions. As you get used to the action of inhaling against a resistance with maximum effort, you should find that your results become more consistent and controllable. You may still find that there is variation from day to day, depending upon your physical condition and state of mind on a particular day, just as with any other form of exercise.

**13. The load seems to disappear towards the end of the breath, is this right?**

The POWERbreathe K4 creates a resistance to inhalation that varies in relation to the volume of air inhaled. This load is designed to match the strength characteristics of the inspiratory muscles for optimum training effectiveness. The load will be highest at the start of the breath and will gradually reduce to near zero at the end of the breath.

**14. Does the volume displayed correspond to my lung capacity?**

The volume displayed during a test or training session corresponds to the inhaled volume of air. This will be lower than typical expiratory vital capacity measured by spirometry. This is mainly due to differences in the temperature and humidity of the air under the different measuring conditions.

**15. What are  $\text{cmH}_2\text{O}$ ?**

$\text{cmH}_2\text{O}$  stands for centimetres of water and is a standard medical measurement of pressure. Load on the breathing muscles is measured using this unit as it corresponds to the pressure which the breathing muscles generate within the lungs whilst working against the resistance created by the POWERbreathe K4.

**16. How is strength Index calculated?**

Strength index is a measure of inspiratory muscle strength that is based upon the maximum flow of inhaled air that the user can generate. The calculation of Strength Index is based upon scientific research which investigates the force-velocity characteristics of the inspiratory muscles.

**17. Can more than one person use the same POWERbreathe K4 unit?**

For hygiene reasons, we recommend that users do not share the same POWERbreathe K4 Valve Head. However, additional Valve Heads may be purchased separately and used with the same POWERbreathe K4 handset.

**18. What if I don't see any improvements?**

If you are not seeing any improvements in the training or test results that you are achieving, try increasing the level that you are training against (see section 6.2). It is important that you are training against a load which is challenging in order to increase the strength of your inspiratory muscles. However, remember that after 6 to 8 weeks your training improvements will tend to plateau. After this time, aim to maintain your improved breathing by continuing to train regularly (see section 7.5)

**19. What happens if I cough during a breath?**

If you cough during a breath, remove the POWERbreathe K4 from your mouth and take a rest until you feel you have recovered. Then return the device to your mouth and continue your training session.

## 16. Limited One Year Manufacturer's Warranty

### Please retain this information for your records

This warranty gives the purchaser specific legal rights. The purchaser may also have other statutory rights. POWERbreathe International Ltd. hereby warrants to the original purchaser whose name shall be duly registered with the company, that the product sold by it is free from manufacturing defects in material and/or workmanship.

The obligations of POWERbreathe International Ltd. under this warranty are limited to the repair and replacement of such part or parts of the unit as shall be found upon inspection to be defective in material or workmanship.

This warranty does not apply to the battery, mouthpiece, nose clip or software (when applicable), cracked or broken cases as well as, misuse, abuse or accidents, negligence of the precautions, poor maintenance (e.g. parts blocked by scale) or commercial use. During the one year warranty period, the product will be either repaired or replaced (at our option without charge).

No responsibility is assumed for any incidental or consequential damages including, without limitation, damages resulting from inaccuracy or mathematical inaccuracy of the product or the loss of stored data

The warranties contained herein are expressly in lieu of any other warranties including implied warranty of merchantability and / or fit for purpose.

Warranty specifications may change without notice due to manufacturers continuous programme of development. Please check [www.powerbreathe.com](http://www.powerbreathe.com) for latest details.

### To Activate Your Warranty

**Please ensure that you register the purchase of your POWERbreathe K4 model by visiting [www.powerbreathe.com](http://www.powerbreathe.com).**

**Thank You.**



## 17. Customer Service Contact

If you need to send your POWERbreathe K4 to an official service centre, please refer to the contact information below. To help us to provide a better service, please include a description of the reason for returning the unit. Please also include proof of purchase. We recommend that returns are sent by recorded delivery.

### Head Office:

#### **POWERbreathe International Ltd**

Northfield Road, Southam, Warwickshire  
CV47 0FG, England, UK

Telephone: +44 (0) 1926 816100

**powerbreathe.com**

For customer service enquiries in all other countries and for POWERbreathe K-Series calibration enquiries, please consult the website or contact POWERbreathe International Head Office in the UK.


### Distribution:

#### **UK:**

HaB International Ltd.

Telephone: +44 (0) 1926 816100

**habdirect.com**

 HaB GmbH,  
Porschestra. 4,  
D-21423 Winsen an der Luhe,  
Deutschland.

#### **North America:**

POWERbreathe

Customer Support and Shipping  
7621 East Joy Road, Ann Arbor,  
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POWERbreathe devices are not toys. This product is designed to be used for breathing exercise only. Any other use is not recommended.

Always seek the advice of your doctor or other health provider with any questions you may have regarding a medical condition. This product is not intended to diagnose, cure or prevent any disease. Individual results may vary. No claims are made or implied in the use or results by the use of the equipment herein.

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