Manual 894 E
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Monark Exercise AB

Monark has 100 years’ experience of bicycle production. The Monark tradition has yielded know-how, experience, and a real feel for the product and quality. Since the early 1900s, Monark’s cycles have been living proof of precision, reliability, strength and service. That are the reasons why we are now the world leader in cycle ergometers and the market leader in Scandinavia in transport cycles.

We manufacture, develop and market ergometers and exercise bikes, transport bikes and specialized bicycles. Our largest customer groups are within health care, sports medicine, public authorities, industry and postal services.

For more information: www.monarkexercise.se
Product Information

Congratulations on your new Ergometer.

The Monark 894 E is an ergometer for anaerobic tests that also works as a normal traditional weight ergometer. It is provided with a break, which controls by putting weights in a weight basket. RPM-controlled release of weight basket and test duration up to 99 minutes increase safety and the potential for optimal tests.

The easy-to-use Windows-based software has more setting possibilities with clear presentation graphics. Thanks to double sensors, faster electronics and improved mechanics, performing anaerobic tests is now more efficient and less complicated.

Facts

- Large, well-balanced flywheel 20 kg (44 lbs)
- Adjustable seat height
- Adjustable handlebar with quick release lever
- Stable frame, solid steel tube
- Powder painted
- Wheels for easy transport
- Electronic display with heart rate

Width
- 517 mm (20,3”) at handlebar
- 640 mm (25”) at support tubes

Length
- 1120 mm (44”)

Height
- 945-1295 mm (37,2-51”) at handlebar
- 780-1105 mm (30,7-43,6”) at seat

Weight
- 65 kg (144 lbs)
- Max user weight 125 kg (276 lbs)

Included
- Chestbelt
- PC software
- Power adapter (12 Vmax)

Technical data power adapter
- Output voltage: +9V DC
- Current: 500 mA
- Polarity: Minus (-) in the middle of connector. See Fig: Polarity.
  (Art. No: 9384-650, USA Art. No: 9384-62.)

Serial number

The serial number of your Ergometer is placed according to fig: Serial number.

NOTE!
Use of the product may involve considerable physical stress. It is therefore recommended people who are not accustomed to cardio or not feel completely healthy to first consult a physician for advice.

Fig: Serial number (1)

Fig: Polarity
Operating Instruction

Workload device

When pedalling the subject stores energy in the flywheel. The flywheel is then braked by means of a brake belt/cord which runs around the flywheel. The workload is changed either by using other pedalling speed or by increasing or decreasing the tension of the brake belt/cord against the flywheel by place weights in the weight basket. Weights are in sizes 1 kg, 0,5 kg and 0,1 kg. This makes it possible to vary the workload from 1 kg up to maximum 12 kg in steps of 0,1 kg.

NOTE: 1 kg is the lowest work load that can be set as this is the weight of the basket itself. A weight basket that only weighs 0,5 kg is available as an option.

The weight basket can also be set in its upper free/resting position and does then not give any work load at all. The weight basket is released by pushing the release button(1), on the handlebar. See fig: Workload adjustment.

Power measurement

The cycle is designed to measure the power on the flywheel, because tests/protocols are made for it (for example Åstrand’s and YMCA).

Cycle adjustments

Seat height should be adjusted to a comfortable position. The appropriate height can be to have the knee slightly bent when the sole of the foot is centred over the pedal axle with the pedal to the bottom position. To adjust the seat height loosen the lever(1) on the seat tube. See fig: Adjustments.

The handlebar setting shall give a comfortable position when cycling. During longer exercise sessions it is recommended to occasionally change the handlebar position. To adjust the handlebar loosen the quick release lever(2). See fig: Adjustments.

NOTE! The handlebar stem should be inserted into the frame tube at least 3 inches (about 8 cm). This measure is marked with “MAX” on the stem(3).
Anaerobic testing

Model 894 E has a computer for anaerobic testing and makes the bike possible to connect to an external PC, PC-cable is included. A Windows application, included in the bike, makes it possible to make a lot of different type of anaerobic tests for ex. Wingate tests and so forth. The anaerobic tests can easily be set from 5 up to 300 seconds duration. For a closer explanation of the application look in the program manual, "Monark Anaerobic Test Software User Manual".

NOTE! To perform anaerobic tests the computer on the cycle must be connected to mains supply by the power adapter which is included. Connect the enclosed power adapter in a suitable mains supply socket. The circular connector on the secondary cable from the power adapter is connected to the corresponding socket on the cycle under the instrument cover on the right side. PC cable is connected into the serial port underneath and to a serial port on an external PC. See fig: Brake device in section "Adjusting the break cord/belt tension". The LED(2) on the front of the instrument panel, see fig: Workload adjustments in section "Workload device", indicates both that there is power to the unit and that the weight basket is in its upper locked position. If the weight basket produces resistance it must be moved up in its upper locked position where it does not give any workload. Then the LED is lit - with a delay of about five seconds - indicating that the computer and cycle is in a ready position for a test.
Computer specifications

<table>
<thead>
<tr>
<th>Display</th>
<th>RPM 0 - 250 rev./min</th>
<th>HR 50 - 240 bpm</th>
<th>TIME 0:00-99:59 min:sec</th>
<th>SPEED 0 - 99 km/h or mph</th>
<th>DISTANCE 0.0 - 99.9 km or mile</th>
<th>FORCE 0.0 - 7.0 kp</th>
<th>CALORIES 0 - 999 kcal</th>
<th>WATT 0 - 7 x rpm watt</th>
</tr>
</thead>
</table>

Batteries: 1.5 V x 2, R6 (AA)
Storing temperature: -10ºC - +60ºC
Operating temperature: 0ºC - 50ºC

Computer Instruction

The ergometer is equipped with a Fitness computer showing pedal revolutions per minute (RPM), heart rate in bpm (HR), exercise time in minutes and seconds (TIME), cycling speed in km per hour or miles per hour (SPEED), covered distance in km or mile (DISTANCE). Furthermore the workload (kp = weight basket + weights in kg) can be set which gives a reading of burned calories (CAL) as well as power (WATT) on the computer display. The energy is usually expressed in kJ (kilojoule) or cal (kilocalories, kcal). One kcal is approx. 4.2 kJ. The power is depending on the pedalling speed which makes it possible to adjust the workload/power by increasing or decreasing the pedalling speed.

Press any button or move the pedal to turn on the meter. At the display for heart rate (HR) a heart symbol is lit which means that the meter is trying to find a pulse signal from an external source (chestbelt with electrodes, Art. No: 9339-91). If the meter can not find such a signal this HR function is automatically turned off after 30 seconds. When the function is turned off the heart symbol is not lit any more. The heart rate function can be turned on again by pressing a button.

The timer starts automatically when pedals are moved. Meter values for Time, Distance and Calories can be set to zero by pressing the RESET button for more than two seconds.

To get correct readings for calories and watts the kp value on the electronic meter has to be set to the same value as the workload that is the weight of the basket including the weights in it. The rubber plates are included in the calibrated weight of the 1 kg weight basket.

Example: The workload is 3 kg (weight basket 1 kg + 2 x 1 kg weight). Press the kp button to the left on the meter. The lower display window is now flashing and showing figures in kp. Increase or decrease in steps of 0.1 kp by pressing the kp button (arrow up) or the RESET button (arrow down) until the reading is corresponding with the actual or desired kp values (workload) from the weight basket. After that press the CAL/WATT button to either show the CAL or WATT figures. The watt reading in the display is depending on the pedalling speed. The watts can accordingly be adjusted by increasing or decreasing the pedalling speed.
Km/Miles
Km and km/h is the default setting from the factory. If you want to make a setting in miles take the meter out of the panel. Turn off the meter by taking out one battery. On the back side is a switch(1) with two settings – 1 and ON. See fig: Switch km/miles. 1 is equal to km and km/h and is the default setting. ON is equal to mile and mph. Choose position and install the battery again. Put the meter back again into the panel.

Do not expose the fitness computer to direct sunlight or extremely high temperature. Do not use any solvents when cleaning. Use only dry cloth.
Adjusting the brake cord/belt tension

Check at first that the brake belt is lying correct on the flywheel brake surface. See fig: Brake cord and Brake device. If the weight basket is in its upper position, press the release button(1). The basket will fall down and increase the tension of the brake belt/cord against the flywheel.

Put 9 kg in the weight basket(6). Rotate the flywheel by hand. The basket shall now lift up so the distance to the flywheel is at least 40 mm and maximum 60 mm. If this is not the case the brake belt has to be loosened or tightened a little at the tension center(4). If the basket is too low shorten the belt somewhat and if the basket is too high lengthen the cord somewhat.

Lock the weight basket in its upper position and after that loosen the cord bracket(3) somewhat so that the cord length can be adjusted. Tighten the bracket again and release and check if the measurements above are OK when the flywheel is rotated by hand. Repeat the above if necessary.

NOTE!
To receive correct workload it is important to place the weight basket according to the description above. If the basket hangs too low it may touch the flywheel. If the basket is too high, wrong workload may obtains.
## Trouble shooting guide

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Probable Cause/Corrective Action</th>
</tr>
</thead>
</table>
| There is a click noise with every pedalling (increases with the weight) | The pedals are not tightly drawn, tighten them or change pedals.  
There is a loose in the crank cheek, tighten.  
There is a loose in the base bearing, contact your dealer for service. |
| Scratching sound is heard when pedalling                                | Check that the carriage block is taken off and that none of the covers is scratching.           |
| There is a click noise and a squeak noise when pedalling               | Untighten the chain a bit.                                                                      |
| The display is not working                                              | Check that the batteries are OK.                                                                 |
| Timekeeping does not start                                              | Check if the brake belt is too tight so the magnet will not pass the sensor.  
This will result in no signal from sensor. There is a video available of website www.monark.net which describe adjustment. |
| Bike would not start. Weight basket does not lock in upper position     | 1. Power adapter is not connected.  
2. Main switch is not in ON position. Located on bikes right side underneath tension devise.  
3. The power jack is not functioning, the fuse is blown.  
4. Incorrect type of power adapter is used. A marking label should be found with the text "Peak bike 894 E".  
5. Power adapter is broken and needs to be replaced. |
| Yellow LED does not light as the weight basket raises to its upper locked position (Expected to be lightened within 2-3 sec after weight basket has been raised.) | 1. Check that magnets on both side of tension device has not fallen off and without damages.  
2. Check so basket lock sensor and basket drop sensor is working properly and also connected to correct ports on bikes circuit board. See fig: Connections on Circuit board. |
| Problems with the sensors                                               | Technical advice how to check sensors of magnetic type:  
1. Unplug the sensor on bikes circuit board.  
2. In the jack in the end of sensor cable measure with a summer or an ohmmeter then angle the magnet in near of the sensor. A signal should be heard or value approx. 0 ohm displayed on ohm meter. |
| No heart rate.                                                          | Check the chestbelt (battery). Wet the thumbs and place them on the electrodes. A low clicking sound will appear near battery lid while you click on the electrodes with one thumb.  
Use another external HR monitor to check the belt.  
Check that the chestbelt is positioned correct on test person and tight enough. Check that the electrodes are wet, in hard cases it is necessary to use a contact gel or a mixture of water with a few drops of washing-up liquid.  
The level for HR signal can vary from person to person. Put chestbelt on another known person who has a good pulse rendering. |
| Uneven heart rate.                                                      | Use an external unit for example a pulse watch to check if it also indicates irregular pulse. If it is the case there are probably disturbance in the room. Magnetic fields from high voltage cables, elevators, fluorescent tube etc can cause the disturbance. Other electronic equipment could be placed too close.  
If irregular pulse remains we recommend measuring HR manually. If HR still remains irregular at workload test person’s health need to be examined. |
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| Communication could not be established between the bike and the computer. No RPM visible in Monark software. (Test window.) | 1. Data cable between the bike and the computer is not connected or it is damaged.  
2. Incorrect type of data cable is used. Correct type 0-modem cable.  
3. Start button in Monark software has not been activated.  
4. Communication settings within the Monark software is not correct. Try to change COM-port. In the software’s menu click on —  
   1. Connect the data cable between the bike and the computer.  
   2. Connect power adapter and turn the main switch to ON.  
   3. The green LED on the COM-port tester should light up. This will indicate that the bike’s circuit board is powered on.  
   4. As the weight basket raise to its upper locked position the red LED on the COM-port tester will give a short flash and vice versa as it drops.  
   5. When a person starts to pedal the bike the red LED on COM-port tester will flash in the same tact as the RPM. If all expected flashes could be seen on the COM-port tester the bike can be consider being without malfunction.  
   Technical accessory, COM-port tester (art. no 9394-525) can be used if you have problems with the communications between bike and PC. Procedure:  
   1. Connect the data cable between the COM-port tester and the bike.  
   2. Connect power adapter and turn the main switch to ON.  
   3. The green LED on the COM-port tester should light up. This will indicate that the bike’s circuit board is powered on.  
   4. As the weight basket raise to its upper locked position the red LED on the COM-port tester will give a short flash and vice versa as it drops.  
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   The communication problems is probably caused by the PC where the PC program is installed. Its COM-port could be broken or has an incorrect driver. If that is the problem please contact your network administrator for control of program installations. Or you can try to install the program on another PC. If a USB-Serial adapter used to connect the bike to a laptop, make sure the drivers are installed.  |
| No RPM visible in Monark software. (Test window) | 1. Start button in Monark software has not been activated.  
2. Check that the sensor on flywheel is working properly and that it is connected to the correct port on the bike’s circuit board. See fig: Connections on Circuit board.  
3. Check that the magnet on the flywheel’s left side does not have fallen off. See fig: Sensor and magnet on flywheel. |
Fig: COM-port tester

Fig: Sensor and magnet on flywheel
1) Sensor
2) Magnet

Fig: Connections on circuit board
Connector U: Sensor 1
Connector F: Sensor 2
Connector R: Sensor on flywheel
Connector +: Power supply (red/black wire)
Connector M: Magnet
Connector RS232: Communication cables (5 pcs)
Connector 1MS: Button on handlebar
Service check & Maintenance

To keep your Ergometer in good shape you should make a regular service.

Service action:
• If you wish to disinfect the surface of the bike we recommend isopropyl alcohol. Use a damp but not wet cloth to clean the surface you wish to disinfect.
• Keep your Ergometer clean and properly lubricated (once a week).
• Periodically wipe the surface with a rust preventative, especially when it has been cleaned and the surface is dry. This is done to protect the chrome- and zinc parts as well as the painted parts (4 times per year).
• Check now and then that both pedals are firmly tightened. If not the threading in the pedal arms will be damaged. Also check that pedal arms are firmly tightened on the crank axle, tighten if necessary. When the Ergometer is new it is important to tighten the pedals after 5 hours of pedalling (4 times per year).
• Check that the pedal crank is secure to the crank axle (4 times per year).
• Be sure that the pedals are moving smoothly, and that pedal axle is clear of dirt and fibres (4 times per year).
• When cleaning and lubricating be sure to check that all screws and nuts are properly tightened (2 times per year).
• Check that the chain is snug and there is no play in the pedal crank (2 times per year).
• Check that pedals, chain and freewheel sprocket are lubricated (2 times per year).
• Be sure that the brake belt does not show significant signs of wear (2 times per year).
• Check that the handlebars and seat adjustment screws are lubricated (2 times per year).
• Be sure that all moving parts as crank and flywheel are working normal and that no abnormal play or sound exists. i.e. play in bearings causes fast wearing and with that follows a highly reduced lifetime.
• Check that the flywheel is placed in the centre and with plane rotation.

Warning

Make sure the voltage indicated on the appliance corresponds to the local mains voltage before making connections.

Warranty

EU countries - Private use
If you are a natural person you will have a minimum level of protection against defects in accordance with EC Directive 1999/44/EC. In short, the directive provides for that your Monark Dealer will be liable for any defects, which existed at the time of delivery. In case of defects, you will be entitled to have the defect remedied within a reasonable time, free of charge, by repair or replacement.

EU countries - Professional use
Monark Exercise products and parts are guaranteed against defects in materials and workmanship for a period of one year from the initial date of purchase of the unit. In the event of a defect in material or workmanship during that period above, Monark Exercise will repair or replace (at its option) the product. Monark Exercise will do so at its expense for the cost of materials but not for labour or shipping.

Other countries
Monark Exercise products and parts are guaranteed against defects in materials and workmanship for a period of one year from the initial date of purchase of the unit. In the event of a defect in material or workmanship during that period above, Monark Exercise will repair or replace (at its option) the product. Monark Exercise will do so at its expense for the cost of materials but not for labour or shipping.

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• Check that pedals, chain and freewheel sprocket are lubricated (2 times per year).
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• Be sure that all moving parts as crank and flywheel are working normal and that no abnormal play or sound exists. i.e. play in bearings causes fast wearing and with that follows a highly reduced lifetime.
• Check that the flywheel is placed in the centre and with plane rotation.
Batteries

If the meter is battery-operated, the batteries are in a separate package at delivery. If the storing time has been long the battery power can be too low to make the computer act correctly. Batteries must be changed.

Crank bearing

The crank bearing is long term greased and require normally no supplementary lubrication. If problem arises, please contact your Monark dealer.

Flywheel bearing

The bearings in the flywheel are lifetime greased and require normally no maintenance. If problem arises, please contact your Monark dealer.

Transport

At transport the brake belt should be somewhat tightened to prevent it from falling off the flywheel.

Replacement of brake belt

To replace the brake belt remove covers if necessary. Make sure that the belt is loose.

Alt. 1: To loosen the belt on pendulum bikes with motor, turn the power on and move the pendulum to 4 kp. Hold it there until brake belt is loose. Observe how the belt is connected. Take it apart and remove it from the bike. Attach the new brake belt and assemble the bike in reverse order.

Alt. 2: To loosen the brake cord on cycles with weight basket set the basket to its upper position. Loosen the lock washer that is holding the cord and remove it from the tension center. Loosen or cut of the knot in the other end of the cord and then remove the hole cord from the bike. When assembling a new brake cord, first enter one end into the hole in the tension center, and tie a knot and let the knot fall into the bigger part of the hole. Lock the end of the cord with the lock washer.

Alt. 3: To loosen the belt on other bikes remove all possible tension. Observe how the belt is connected. Take it apart and remove it from the bike. Attach the new brake belt and assemble the bike in reverse order.

NOTE: When replacing the brake belt it is recommended to clean the brake surface. See ”Brake belt contact surface”.

Brake belt contact surface

Deposits of dirt on the brake belt and on the contact surface may cause the unit to operate unevenly and will also wear down the brake belt. The brake belt contact of the flywheel surface should then be ground off with fine sandpaper and any dust removed with a clean dry cloth.

Remove if there are any covers and loosen the tension on the brake belt. Grind with a fine sandpaper. Grinding is easier to perform if a second individual cautiously and carefully pedals the cycle.

Irregularities on the brake belt contact surface are removed by means of a fine sandpaper or an abrasive cloth. Otherwise unnecessary wear on the brake belt may occur and the unit can become noisy.

Always keep the brake belt contact surface clean and dry. No lubricant should be used. We recommend replacing the brake belt when cleaning the contact surface. In regard to assembly and adjustment of the brake belt, see ”Replacement of brake belt”.

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It is strongly recommended to keep the chain clean. Dirt build-up on the chain will cause excess wear. A chain lubricant and solvent for normal road bikes may be used.

Check the lubrication and tension of the chain in regular intervals. In the middle of its free length the chain should have a minimum play (3) of 10 mm (1/4 inch). See fig: Chain adjustments. When the play in the chain is about 20 mm (3/4 inch) it must be tightened otherwise it will cause abnormal wear of the chain and chainwheels. Because of this it is always recommended to keep the chain play as little as possible. Loosen the hub nut (2) on both sides and tense the chain with the chain adjuster (1) when needed.

When the chain has become so long that it can no longer be tightened with the chain adjusters it is worn out and shall be replaced with a new one.

To adjust or replace the chain remove frame covers if necessary.

To adjust the chain the hub nuts (2) should be loosened. Loosening or tightening the nuts on the chain adjusters (1) will then move the hub and axle forward or backward. Adjust according to above recommendation. Then tighten the nuts on the hub axle again. See fig: Chain adjustments.

To replace the chain loosen the chain adjuster as much as possible. Dismantle the chain lock (6) and remove the chain. Put on a new chain and assemble the chain lock. The spring of the chain lock should be assembled with the closed end in the movement direction (5) of the chain. Use a pair of tongs for dismantling and assembling the spring (4). See fig: Chain replacement.

NOTE: At assembly the flywheel has to be parallel with the center line of the frame otherwise the chain and chain wheels makes a lot of noise and wears out rapidly.

Adjust chain adjusters to allow chain play according to above. Tighten hub nuts firmly. Put on frame covers again.
Freewheel sprocket

When replacing the freewheel sprocket remove frame covers if necessary. Dismantle the chain as described in part ”Chain 1/2” x 1/8” ”.

Loosen the axle nuts and lift off the flywheel. Remove the axle nut, washer, chain adjuster and spacer on the freewheel side. Place the special remover (Art. No: 9100-14) in the adapter and place the spacer and axle nut outside. See fig: Special remover. Replace sprocket-adapter and assemble the new parts in reverse order according to the above.

NOTE: Do not tighten the axle nut completely. It must be possible to loosen the adapter-sprocket half a turn.

The sprocket should be lubricated with a few drops of oil once a year. Tilt the cycle somewhat to make it easier for the oil to reach the ball bearing. See fig: Lubrication.
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### Monark 894 E

From serial number: WBK 270897

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