Manual 928 E Pro VO_2

MONARK
SPORTS & MEDICAL

Contents

Important

Read the manual carefully before using the cycle and save it for future use.

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. These 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, 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 to your new Ergometer.

The Monark 928 Pro VO_2 is designed to in a simple way be able to perform sub maximal fitness tests and make calculations of the maximal cardiovascular capacity. The device can of course also be used for normal exercise. The ergometer has an adjustable brake system, which shows workload in watts at a pedalling speed of 60 pedal revolutions per minute.

The Monark 928 ProVO_2 is equipped with a computer showing pedal revolutions per minute (RPM), heart rate in beats per minute (HR), exercise time in minutes and seconds (TIME), workload in watts (WORK LEVEL WATT) and calculated maximal oxygen uptake capacity in litres per minute (L/MIN) and in millilitres per minute and per kilo bodyweight (ML/MIN/KG). For a complete directions for the computer please read the part ”Computer specifications”.

All 928 Ergometers are calibrated at the factory. This means that you can begin to use the ergometer directly after assembly. However, if the user wish to verify the scale calibration please read the instruction for “Calibration” in this manual.

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

Facts

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

Width
500 mm (19.7”) at handlebar
640 mm (25”) at support tubes

Length
1240 mm (49”)

Height
1260 mm (50”) at handlebar
780-1170 mm (30.7-46”) at seat

Weight
58 kg (128 lbs)
Max user weight 250 kg (550 lbs)

Included
Chestbelt
PC-program
Åstrand’s book ”Work tests with the bicycle ergometer”

Serial number

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

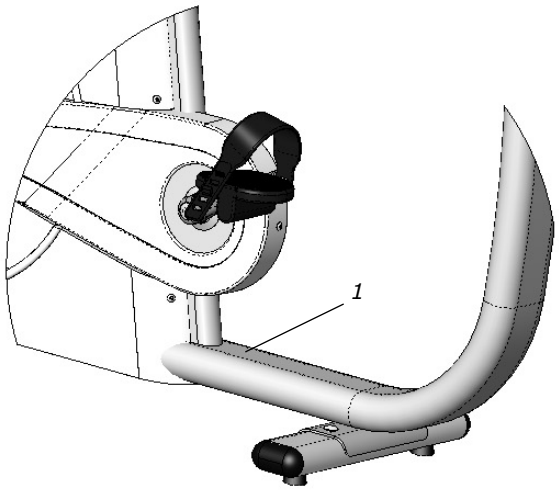


Fig: Serial number (1)

Operating Instruction

Workload device

Through cycling supplies the test person kinetic energy to the flywheel. This is braked by means of a brake belt which runs around the bigger part of the brake surface of the flywheel. The workload is changed either by using another pedalling speed or by increasing or decreasing the tension of the brake belt against the flywheel by means of the work load control knob. A change of the workload is done either by changing the pedal speed or by turning the tension knob, see *fig: Tension knob*. Turning the knob clockwise will increase the workload and turning it counter clockwise will decrease the workload. The power level can be read on the big scale on the left side of the bike. At 60 RPM the workload level is from 0-250 watts.

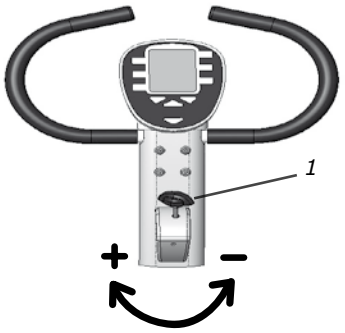


Fig: Tension knob

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 is 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 turn the quick release bolt(1) on the saddle post and pull until the saddle post is loose. See *fig: Adjustments*.

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

Fig: Adjustments
1) Quick release bolt
2) Quick release lever

Computer specifications

Display		
Pedalrev. (RPM)	0 - 250	rev/min
Heart Rate (HR)	0 - 220	bpm
Time (TIME)	0 - 99	min:sec
Workload (WATT)	50 - 250	watts

Batteries: 1.5V x 4, R14
Storing temperature: -10°C - +60°C
Operating temperature: 0°C - 50°C

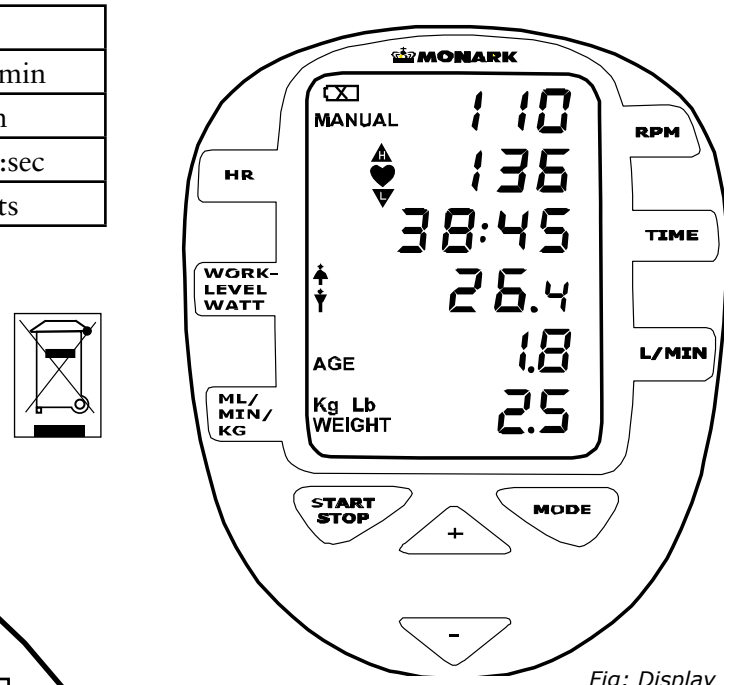


Fig: Display

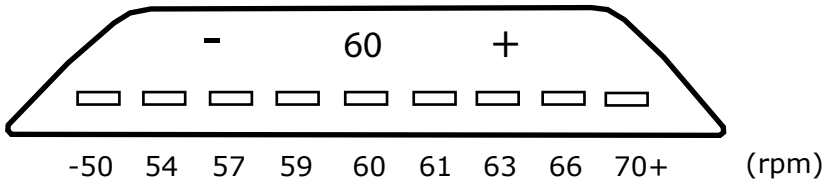


Fig: LED-indicator for RPM

Computer Instructions

Press any button or turn the crank and the computer will be activated.

When pressing START/STOP the heart symbol will light up in the display for heart rate (HR), which means the computer tries to detect a pulse signal from an external wireless transmitter. This signal comes from a chestbelt with electrodes which is delivered with the bike. The electrodes on the belt shall be moistened a little before it is put on the chest. Moistening makes the signal good already from start. The chestbelt is to be placed just below the chest muscle. If the computer can not find any signal this function for measuring is automatically turned off after 30 seconds. When this occur the heart symbol is turned off and time stops. This function can be reactivated by pressing START/STOP again.

Time starts when START/STOP is pressed once. At next press on START/STOP all calculations are stopped. When pressing START/STOP after time is stopped, the time function is set to zero and started again. Calculations made on oxygen uptake (L/MIN and ML/MIN/KG) are stored in the display for three minutes after pressing STOP to finish the test. Also the final HR is stored during this period. After three minutes all data is erased automatically.

LED-indicator bar for RPM

A pedal speed indicator bar is located on the upper side of the computer. If the display is put on in a forward direction the subject can see it to hold correct rpm.

HR-limits

Upper and lower HR-limits can be set for exercise.

HR alarm function

A sound alarm can be turned on or off. The alarm is turned on /off by, at the same time, pressing the keys (+) and (-). When function is turned on a repeated alarm sounds when exceeding the upper or the lower limit.

The computer can be used in two different ways

1. For automatic HR detection and calculation of maximal oxygen uptake.
2. For manual setting of HR and workload after which a calculation of the maximal oxygen uptake is made. The computer always has a default setting for automatic calculation when it is turned on.

When the computer is set to Manual mode it can be used as a calculator for calculating oxygen uptake when the final HR and workload are known figures. See example below.

Auto Mode (default)

Take the chestbelt and moisten the electrodes a little. Put on the transmitter belt just below the chest muscle and adjust to a comfortable feeling. The logo on the belt shall face straight forward. Press START/STOP on the computer. The heart symbol is lit in the display and the HR is displayed in a few seconds. Check that HR reading is steady.

After that make personal settings. Adjustment of figures can only be made when numbers are flashing.

EXAMPLE:

- Press (+) and then MODE. The upper HR limit is flashing and can be adjusted by (+) or (-).
- Press MODE again. The computer changes to lower HR limit. Adjust by (+) or (-).
- Press MODE again and computer shows “SEX” symbol. Adjust by (+) or (-) if needed.
- Press MODE and the computer shows “AGE” flashing. Adjust by (+) or (-) if needed.
- Press MODE, and (Kg) is flashing. Adjust to lb if preferred. If weight is set in kg just press MODE again and increase or decrease with (+) or (-) to correct figure.

Personal settings are now finished and the computer will turn to normal display after five seconds.

Let the subject begin pedalling at 60 rpm. Set workload to correct level by turning the tension device near the handlebar and check the workload reading on the big scale behind the left pedal.
Press (+) on the computer and adjust by (+) or (-) to the same reading as on the scale. When work level stops flashing press START/STOP and the test starts.

Let the subject pedal for six minutes and then stop test if the HR reading has reached steady state. The test result is then stored in the display for 3 minutes.

Manual Mode

Press MODE and hold for two seconds. Indication ”MANUAL” will appear in the upper left corner in the display.

EXAMPLE:

- Press (+), (WORK LEVEL) begins to flash.
- Press (+) or (-) , to adjust work level.
- Press MODE, the heart symbol lights up and heart rate (HR) numbers begins to flash. Adjust by pressing (+) or (-) until correct HR-figure shows.
- Press MODE again and symbol for sex begins to flash. Press (+) or (-) for adjustment.
- Press MODE and adjust age (AGE) by pressing (+) or (-).
- Press MODE and (KG) flashes.
- Press MODE again if no change is to be done for input of weight in pounds. Adjust the weight in kg by (+) or (-) and wait until the display stops flashing.

The calculated maximal oxygen uptake in LITER/MINUT and MILLILITER/MINUT/KILO bodyweight can now be read in the display.

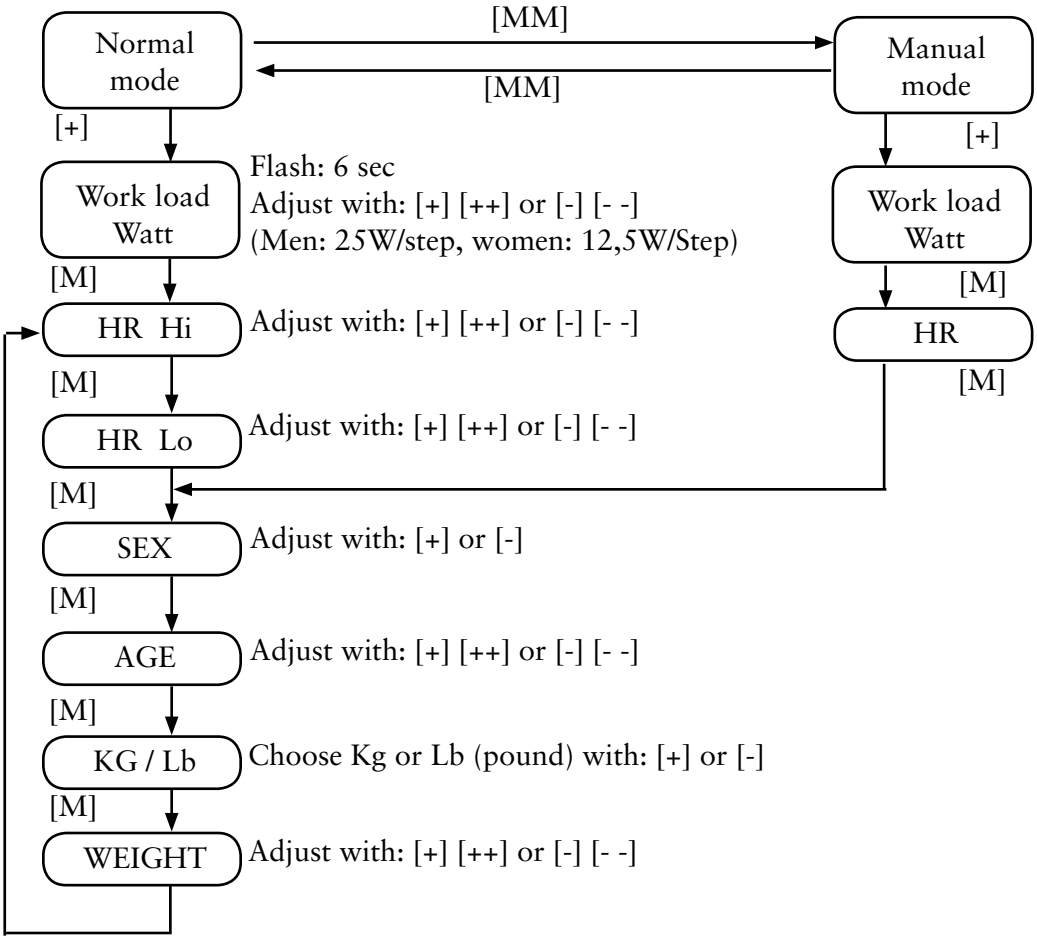
Maintenance

Do not expose the computer to direct sunlight or extremely high temperatures. Do not use solvents when cleaning, just a dry cloth.

Flow chart

[M]	Press MODE-key
[MM]	Press MODE-key and hold for two seconds
[+]	Press + key
[++]	Press + key and hold for two seconds (gives faster increase/decrease)
[-]	Press - key
[- -]	Press - key and hold for two seconds (gives faster increase/decrease)

ALARM on/off by pressing (+) and (-) at the same time



NOTE: The computer will store the data in the display for three minutes after exercise. After three minutes, any key (or any speed data detected) will turn on the display.

Scale - zero adjustment

Loosen possible tension in the brake belt by turning the knob at the handlebar counter clockwise as far as possible. Check that the moving pointer is aligned with the 0-index on the scale. If adjustment is needed, first loosen the locknut(1) and then change the position of the scale board, so that it will have its 0-index in line with the moving pointer. Tighten the locknut after the adjustment.

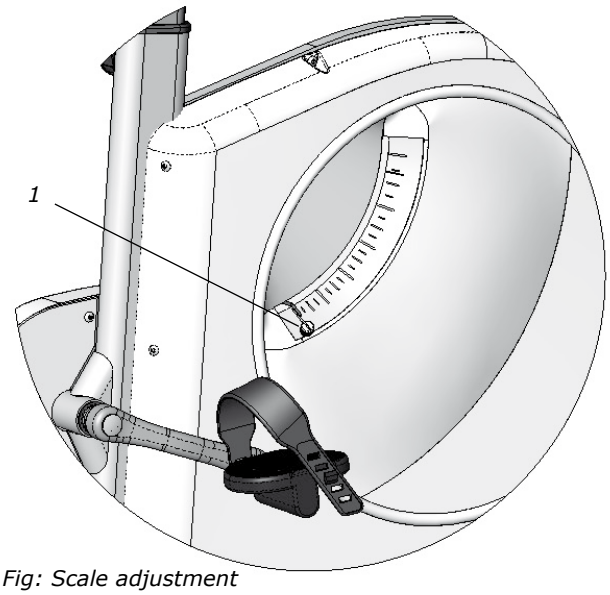


Fig: Scale adjustment

Calibration

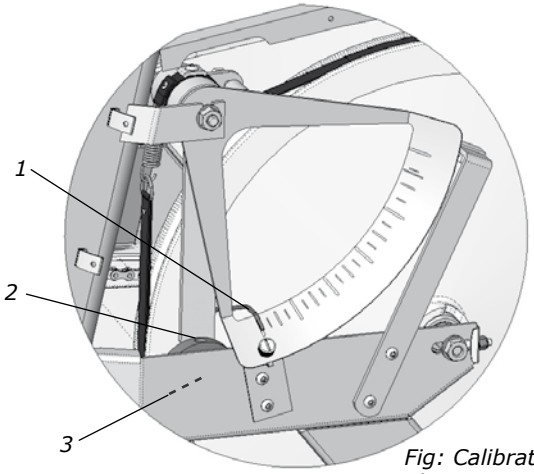
Although all Ergometers are calibrated at the factory the user may wish to verify this by performing a mechanical scale calibration. If so please do according to the following.

Loosen possible tension in the brake belt by turning the tension devise (knob) at the handlebar counter clockwise as far as possible. Check that the scale 0-index is in line with the pointer(1). See *fig: Calibration*. If adjustment is needed adjust according "Scale -zero adjustment".

A known weight(4), preferably 4 kg (Art. No: 9000-211), is attached at(5). See *fig: Calibration*. The pointer shall at correct calibration point at the calibration index(6) slightly above 225 watts.

If there is a deviation, adjust the pointer to correct position by the adjustment weight inside the pendulum(2). To do this the left cover has to be removed. To adjust the position of the adjustment weight the locking screw in the centre of the pendulum(3) must be loosened. If the pointer shows too low the internal weight must be moved upwards somewhat. If the pointer shows too high the adjustment weight is moved down a little. This procedure is repeated until pointer is in the correct position.

Check the scale calibration once a year or if you feel there is a need for it.



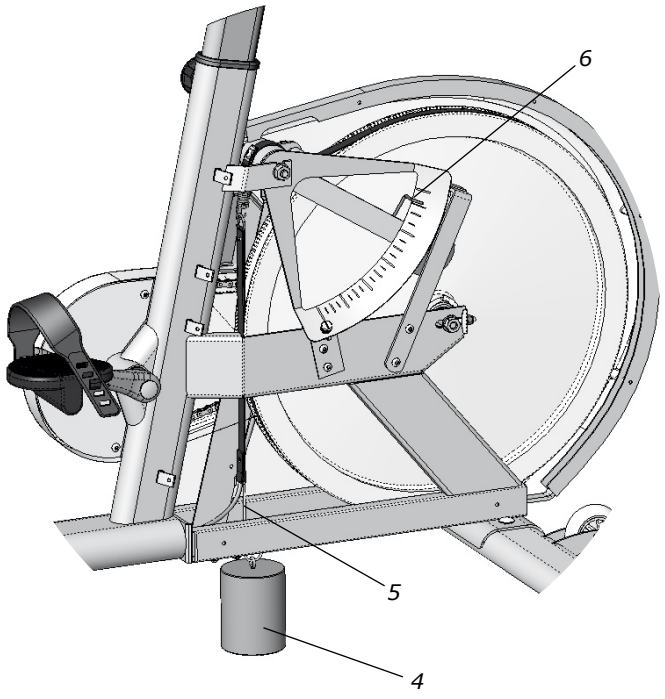


Fig: Calibration
1) Pointer at 0-index
2) Adjustment weight
3) Locking screw
4) Calibration weight
5) Hook for calibration weight
6) Pointer at 225 watts

Troubleshooting guide

Symptoms	Probable Cause/Corrective Action
There is a click noise with every pedal revolution (increases with the weight).	The pedals are not tight. Tighten them or change pedals. The crank is loose. Check, tighten. The base bearing is loose. 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.	Loosen the chain.

Service

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 consumer living in the EU you will have a minimum level of protection against defects in accordance with EC Directive 1999/44/EC. In short, the directive states 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, Monark Exercise will repair or replace the product. Monark Exercise will not, however, refund costs 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 as above for labour or shipping.

Service check & maintenance

It is important to carry out a regular service on your ergometer, to ensure it is kept in good condition.

Service action:

- We recommend isopropyl alcohol to disinfect the surface of the bike. Use a damp, but not wet cloth to clean the surface you wish to disinfect.
- Clean and lubricate your Ergometer weekly.
- 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 that pedals are firmly tightened. If not, the threading in the pedal arms will be damaged. Also check that the 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 the 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 (twice a year).
- Check that the chain is snug and there is no play in the pedal crank (twice a 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 (twice a year).
- Check that the handlebars and seat adjustment screws are lubricated (twice a year).
- Be sure that all moving parts, crank and flywheel are working normal and that no abnormal play or sound excsists. I.e. play in bearings causes fast wearing and with that follows a highly reduced lifetime.
- Check that the flywheel is placed in the center 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 greased and normally requires no supplementary lubrication. If a problem arises, please contact your Monark dealer.

Flywheel bearing

The bearings in the flywheel are greased and do not normally require maintenance. If a problem arises, please contact your Monark dealer.

Transport

At transport the brake belt should be 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 a motor, turn the power on and move the pendulum to 4 kp. Hold it there until the 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 a 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 off the knot on the other end of the cord and then remove the whole cord from the bike. When assembling a new brake cord, first enter one end into the hole in the tension center, 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 contact surface of the flywheel should be smoothed with fine sandpaper and any dust removed with a clean dry cloth.

Remove any covers and loosen the tension on the brake belt. Smoothe with fine sandpaper. This 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”.

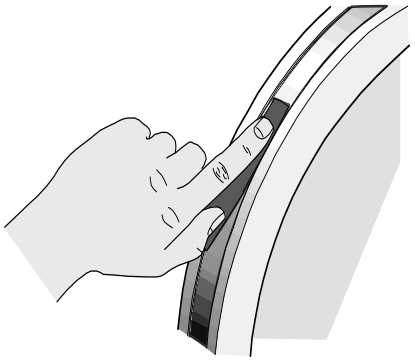


Fig: Brake belt contact surface

Chain 1/2" x 1/8"

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 at 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.

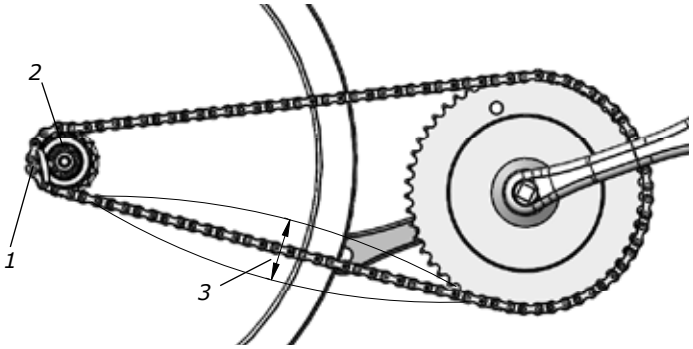


Fig: Chain adjustments
1) Chain adjuster
2) Hub nut
3) Chain play

When the chain has become so long that it can no longer be tightened with the chain adjusters it is worn out and should 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*.

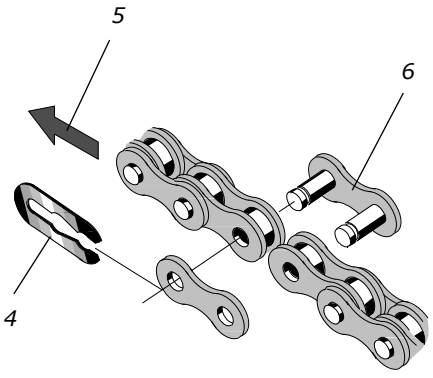


Fig: Chain replacement
4) Lock spring
5) Movement direction
6) Chain lock

NOTE: At assembly, the flywheel has to be parallel with the centerline of the frame otherwise the chain and chain wheels make a lot of noise and wear out rapidly.

Adjust chain adjusters to allow chain play according to above. Tighten hub nuts firmly. Replace frame covers.

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 adaptor and place the spacer and axle nut outside. See *fig: Special remover.* Replace sprocket-adaptor 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 adaptor-sprocket half a turn.

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

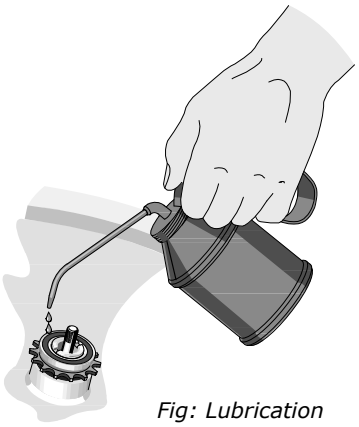


Fig: Lubrication

Fig: Special remover (Art. No: 9100-14)

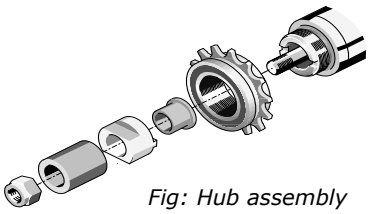
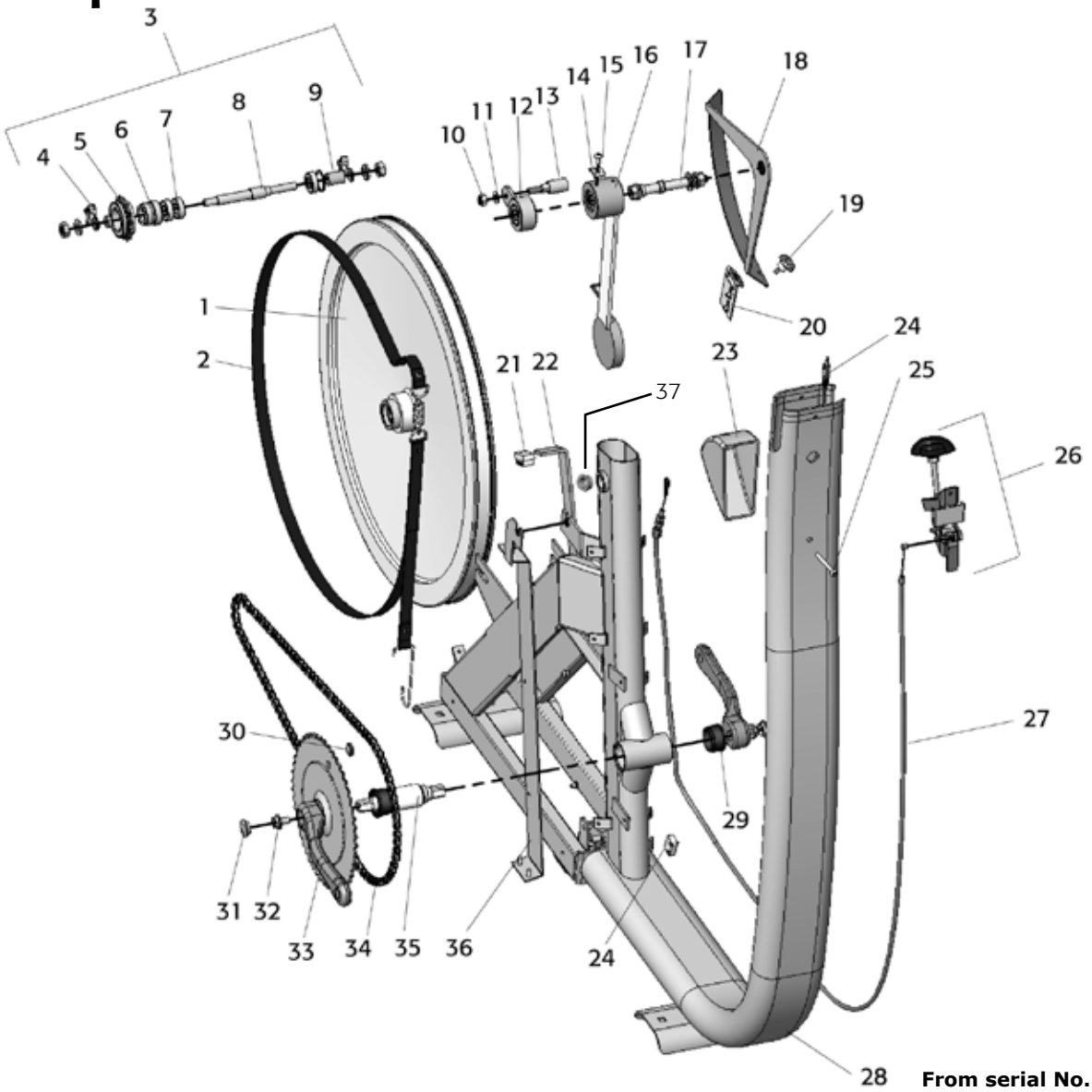


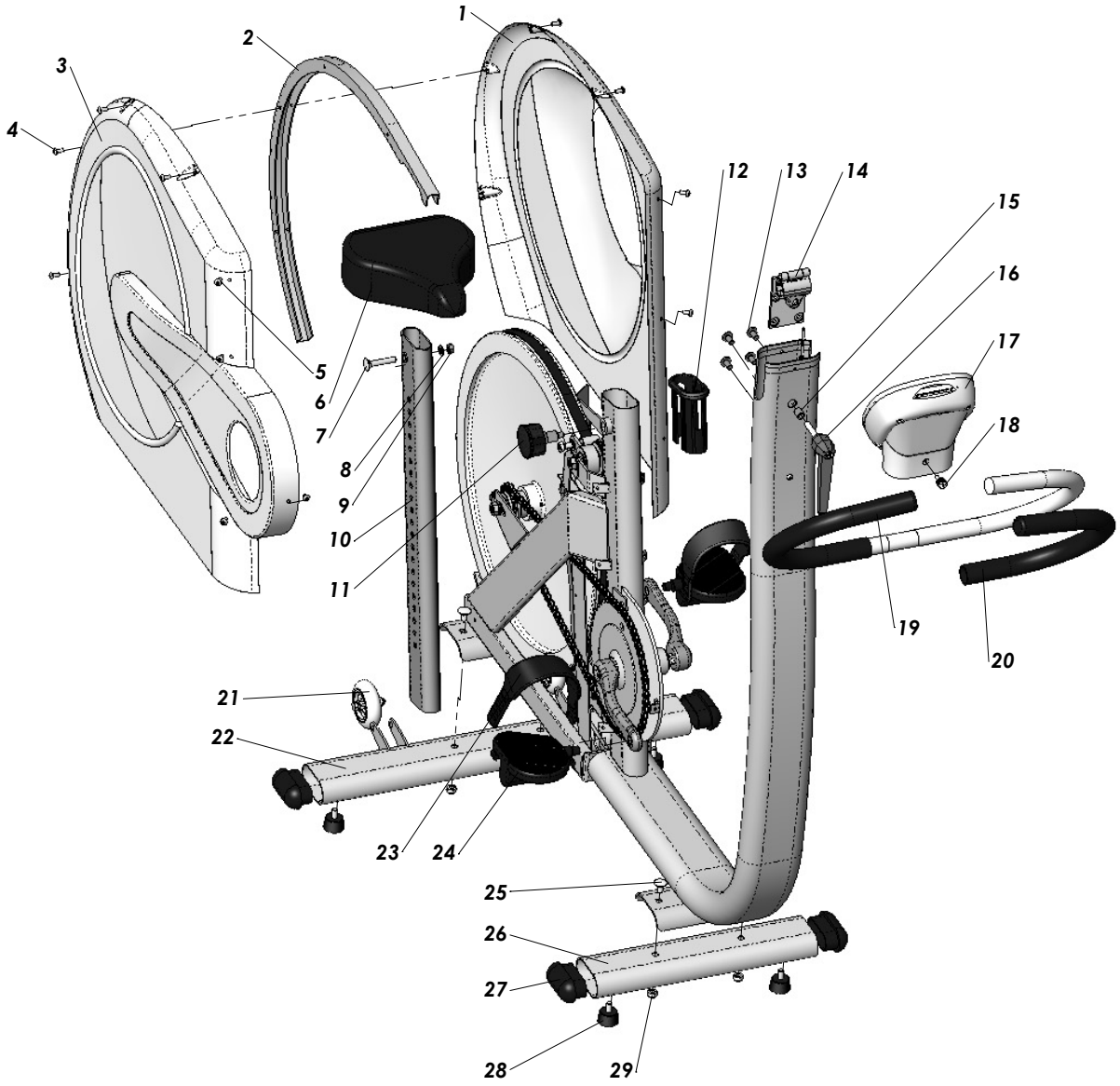
Fig: Hub assembly

Spare parts



From serial No. WBK 271946

Pos.	Qty.	Art. No.	Description	Pos.	Qty.	Art. No.	Description
1	**1**	**9300-3**	**Flywheel**	**20**	**1**	**9328-29**	**Scale lock**
2	**1**	**9328-64**	**Brake belt, complete**	**21**	**2**	**9300-99**	**Plastic stop**
3	**1**	**9300-24**	**Wheel suspension, compl. set**	**22**	**1**	**9328-62**	**Stop**
4	**1**	**9000-12**	-Chain adjuster (pair)	**23**	**1**	**9309-80**	**Control cover**
5	**1**	**9106-13**	-Sprocket	**24**	**1**	**9328-162**	**Crank sensor w. 1750 mm cable**
6	**1**	**9106-14**	-Connection	**25**	**1**	**5698**	**Screw M5x55**
7	**3**	**19001-6**	-Bearing 6001-2z	**26**	**1**	**9328-73**	**Tension device, complete**
8	**1**	**9300-18**	-Axle	**27**	**1**	**9328-300**	**Tension cable, complete**
9	**1**	**9300-17**	-Bush, 23 mm	**28**	**1**	**9328-1**	**Frame**
10	**1**	**5799**	**Nut**	**29**	**1**	**8966-176**	**Support casing for BB-bracket**
11	**1**	**5881**	**Washer**	**30**	**1**	**9371-16**	**Magnet**
12	**1**	**9328-420**	**Level with ball bearing**	**31**	**2**	**8523-2**	**Dust cover for crank**
13	**1**	**9328-801**	**Axle with bearings, complete**	**32**	**2**	**8523-115**	**Screw M8x1x20**
14	**1**	**9126-77**	**Joint clamp**	**33**	**1**	**9300-430**	**Steel crank set, complete**
15	**1**	**5675-9**	**Screw M5x6,5**	**34**	**1**	**9326-55**	**Chain, 98 L**
16	**1**	**9328-8800**	**Weight lever with bearings**	**35**	**1**	**8966-175**	**BB cartridge bearing**
17	**1**	**9328-90**	**Swing axle, complete**	**36**	**1**	**9328-58**	**Tension stay**
18	**1**	**9328-802**	**Plate with watt scale**	**37**	**1**	**9328-33**	**Adapter M20/M16**
19	**1**	**9000-105**	**Screw, M5x10**				



From serial No. WBK 271946

Pos.	Qty.	Art. No.	Description	Pos.	Qty.	Art. No.	Description
1	1	9328-59	Frame cover, left	19	4	9300-12	Screw M8x16
2	1	9328-4	Aluminium profile	20	1	9328-5	Support tube, front
3	1	9328-60	Frame cover, right	21	4	5845	Locking nut
4	9	5675-9	Screw M5x6,5	22	1	9328-9	Handlebar
5	21	5673-9	Screw M5x12	23	1	9328-72	-Handgrip (pair)
6	1	4994-50	Saddle	24	1	9000-105	Screw M5x10
7	1	5605-1	Screw M8x46	25	1	9328-160	Digital meter, complete
8	1	5864	Washer	26	1	9100-280	Lever, complete
9	1	5844	Locking nut	27	1	9127-37	Spacer 13 mm
10	1	9328-130	Saddle post	28	1	5864	Washer
11	1	9328-132	Locking knob	29	1	9328-2	Handlebar clamp
12	1	9328-37	Transport wheel, compl. (pair)	30	4	9337-38	Screw M8x16
13	1	9328-6	Support tube, rear	31	1	9328-131	Bushing for saddle post
14	4	9328-51	Plastic cap, blue		1	9328-150	Screw set
15	4	9328-26	Rubber foot		1	9339-98	Chestbelt
16	1	9300-207	Foot straps (pair)		1	9328-550	Decal set
17	1	9300-220	Pedal (pair)		1	9000-211	Calibration weight, 4 kgs
18	1	9309-3	Holder for chain cover		1	9328-78	Handlebar, wide splines, compl.

Notes:

Notes:

MONARK EXERCISE AB

Version 1010
Art. No: 7950-322

CE 0402

KROONS VÄG 1, SE-780 50 VANSBRO, SWEDEN | WWW.MONARKEXERCISE.SE | TEL: +46(0)281 59 49 40 | FAX: +46(0)281 719 81