## Contents

Monark Exercise AB ........................................ 4

Product Information ........................................ 5  
  Facts ................................................................. 5  
  Serial number .................................................... 5  
  PC software ..................................................... 5  

Operating Instruction ...................................... 6  
  Workload adjustment ......................................... 6  
  Power measurement ........................................... 6  
  Power Connection ............................................ 6  
  Connection to an external unit ................................ 6  
  Cycle adjustments ............................................ 6  
  Calories ............................................................ 6  

Pulse function ................................................ 7  
  Pulse standard (chest belts) .................................. 7  
  Pairing display and chest belt ................................ 7  

Display Description ........................................ 8  
  Sleep mode ...................................................... 8  
  Personal settings .............................................. 9  
  Alternative power / force display .......................... 9  

User settings .................................................. 10  
  Units .............................................................. 10  
  Cycle constant ................................................ 10  
  Metronome cadence .......................................... 10  
  BikeID ............................................................. 10  
  Base Power ..................................................... 11  
  Steady State HR ............................................... 11  

Calibration ..................................................... 12  
  Manual motor control ...................................... 12  
  Current potentiometer value ................................ 12  
  Scale - zero adjustment ..................................... 13  
  Mechanical calibration ...................................... 13  

Training ......................................................... 14  

METS ............................................................... 15  

Astrand ............................................................ 16  

YMCA ............................................................... 18  

Increment ........................................................ 20  

PWC ................................................................. 22  

Troubleshooting guide ...................................... 24  

More information ............................................. 25  
  References / Literature: ...................................... 25  

Service ............................................................ 26  
  Warranty .......................................................... 26  

Spare parts list ............................................... 30  

---

**Important**

Read the manual carefully before using the cycle and save it for future use.
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. Those 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: http://www.monarkexercise.se
Product Information

Thank you for choosing a test cycle from Monark!

The Monark 928 E G3 / 928 G3r is designed to, in a simple way, be used for submaximal exercise test and make calculations of the maximum oxygen uptake. The bike can also be used for normal exercise.

Ergometer 928 G3 is equipped with a meter that is available in two versions - 928 G3 and 928 G3r. 928 G3 has 6 different programs and 928 G3r has two programs. The cycle can also be connected to a computer with software for testing (software is available for free download from our website: www.monarkexercise.se).

The G3 models also have a new and more powerful engine for faster power control.

For more detailed description of the meter's functions, see the section "Display Description".

All 928 G3 and 928 G3r are calibrated at the factory. This means that you can begin to use the ergometer directly after assembly. However, if the user wishes to verify the scale calibration please read the instruction for "Calibration" in this manual.

### Facts

- Large, well-balanced flywheel 20 kg (44 lbs)
- Can be calibrated.
- Adjustable saddle with quick release lever
- Adjustable handlebar
- Stable frame, solid steel tube
- Powder painted
- Wheels for easy transport
- Electronic display with multiple functions

### Dimensions

**Width**
- 500 mm (20 1/3") at handlebar
- 640 mm (25") at support tubes

**Length**
- 1240 mm (49 4/5")

**Height**
- 1260 mm (49 2/3") at handlebar
- 780-1170 mm (31"-46") at seat

### Weight
- 58 kg (128 lbs)
- Max user weight 250 kg (551 lbs)

### Included
- Chest belt
- Calibration weight 4 kg
- Power adaptor

### Technical data power adaptor
- Input voltage: 100-240 V AC, 47-63 Hz
- Output voltage: 12 V DC
- Current: 2.5 A
- Polarity: n/a
  (Art. No: adaptor 9328-183, plug (EUR) 9328-192)

### Serial number

The serial number is placed according to Fig: Serial number.

### PC software

If you need a software (for PC) to do exercise tests on the bike, our software is available for free download from our website: www.monarkexercise.se.

NOTE!

Use of the product may involve considerable physical stress. It is therefore recommended that people who are not accustomed to cardiovascular exercise or who do not feel completely healthy, should consult a physician for advice.

![Fig: Serial number (1)](image)
Operating Instruction

Workload adjustment

A change of the workload is done either by changing the pedal speed or by pressing (+/-) button on the meter to increase or decrease the brake belt tension on the flywheel. See Fig: Workload adjustment and connections.

Power measurement

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

Power Connection

The bike is designed to be used with the AC adaptor which is included with the bike. Connects (3) to the bike as shown in Fig: Adjustments.

Connection to an external unit

When the USB connector is inserted or when the meter detects a connected computer, you will hear a quick double beep. An icon for the USB lights in the display. Otherwise, the meter will turn off except rpm and HR. When the meter is connected to a computer, it turns to passive mode. No buttons are active except HEART button (to pairing the display and chest belt).

The socket for the USB connector (1) is shown in Fig: Workload adjustment and connections.

Cycle adjustments

When adjusting the seat height:

Turn the knob (1) on the seat post and pull it out. Adjust the height and lock the knob again.

Handlebar settings

To adjust the handlebar angle loosen the quick release lever (2). See Fig: Adjustments.

Calories

There have been different theories on how to calculate this, since it depends on several factors and this means that it can only be seen as an estimate.

As a standard calculation when we display calories on our calibrated bikes we use: 1 minute with 100W gives 7 kcal. It is easy to convert watts to calories if it was on the flywheel (the formula is 1W=0,2388x10^{-3} kcal/s with four decimals), but when you normally show calories you want to show the total amount of calories your body has used during your training, not only the calories "burnt" on the flywheel.

We have chosen the formula given above that we think complies with the results given for a standard cycle position.
**Pulse function**

The user's heart rate can be measured with a chest belt that senses the electronic output of the heart. Chest belt ANT+ is supplied as standard.

Fuss-free HR measurement requires that the belt is correctly placed. Make sure that your skin is clean where the chest belt should be placed. When it is correctly fitted the logo on the belt will be central and readable, outward and upright, by another person. The chest belt should be secured at a comfortable tension around the mid section, just below the breast muscle, see *Fig: Placement of the chest belt*. Moisten the electrodes before use, see *Fig: Moistening the electrodes*.

**NOTE!** Electromagnetic waves can interfere with the telemetry system. Cellular phones are not allowed to be used near the bike during test.

**Pulse standard (chest belts)**

The following pulse standard / chest belts can be used:

- Standard, uncoded 5K chest belts (5-5.6 kHz)
- Chest belts with ANT+

Short range ANT+: 0.6-0.8 m (24"-31 ½")
Long range ANT+: 4-5 m (13-16 ft)
Range 5K: 0.8 m (31 ½")

**Pairing display and chest belt**

Normally the display connects to the first ANT+ chest belt in "short range" and shows the heart rate until the chest belt is outside the "long range". If there is no ANT+ chest belt but a 5K chest belt in "short range", the heart rate from the 5K chest belt is displayed until the signal is lost.

ANT+ is prioritized and the first choice of the display. 5K is discriminated, but after 30 seconds with only 5K the display is locked to this chest belt as long as you do not lose the signal.

Monark Exercise AB recommend that you use an ANT+ chest belt for best function.

![Placement of the chest belt](image1)

![Moistening the electrodes](image2)

*The images above are used with permission of Polar Sweden.*
Sleep mode

Sleep mode is activated after 10 minutes if you do not press any button or if no rpm is recorded.

All settings are saved, but the personal settings are erased (to protect your personal privacy).

The meter wakes up when you press any button or if rpm is recorded. The meter goes directly to 'Quick start' (see separate section).
Personal settings

Usually you are asked to set the personal data needed when you start a program or a test. This data can also be set before, during e.g. "Warm up" in Training program with this function.

The settings are saved until the meter goes into sleep mode. When the display wakes up the personal settings are changed to default values (this is to protect your personal privacy).

Alternative power / force display

The meter displays power in watts (default). If you want to display the power in kpm / min instead, press the HEART button for 5 seconds. Then you can switch between WATT, KPM / MIN and current kp-value using the (+/-) button. Press ENTER or wait 10 seconds to confirm and exit the setting.

NOTE!
Even if you select kp as unit, it is power in watts which is set in the background when you press (+/-) button.

The displayed kpm / min is a simplified calculation (1 kp = 10 N) according to Astrand's tables.

(Although the displayed kp value is correct and not rounded as above. For all calculations in the display the exact value is used, 1 kp = 9.80665 N)

NOTE!
When you press the HEART button the meter starts searching for a HR signal. (Remember this if you also set the Steady State.)
**User settings**

Here you can make individual adjustments to optimize the bike for your needs on first use and when needed.

**Units**

Kg, km, km/h, ml/min/kg are default. You can switch between the different unit combinations with (+/-) button.
- Kg, km, km/h, ml/min/kg (default)
- Kg, km, km/h, METS
- Lbs, miles, miles/h, ml/min/kg
- Lbs, miles, miles/h, METS

**Cycle constant**

The cycle constant is as default set to 1.00. Change using the (+/-) button.

When the cycle constant is set to 1.00 the power is measured at the flywheel. This is used in Astrand test, YMCA etc.

When the cycle constant is set to 1.05 the power is measured at the crank. This is often used on electronically-braked bikes.

**Metronome cadence**

Metronome diodes show pedalling revolutions (rpm) relative to the set reference value. The metronome is located at the back of the meter. The default value is 60 and can be adjusted with (+/-) button. The green LED in the middle flashes twice for each pedal revolution which helps to keep the right pedal cadence, see Fig: Display and Fig: Metronome.

The meter can be rotated so that the rider does not see the values in the display, but only sees the flashing diodes (in order to keep the right pedal cadence).

**BikeID**

This ID is a parameter that the PC software can ask for. It is used to identify or number bikes when multiple bikes are controlled by same PC or similar.
Base Power
(Except 928 G3r)

Default value which is used as "idle" power when no program or test is active. The default value is 25 but can be adjusted with (+/-) button.

Steady State HR
(Except 928 G3r)

Default value is (±)3 but can be adjusted between 1 and 10 with (+/-) button.

Steady State (SS) HR is used only in Astrand program. SS is checked by comparing the mean value of HR during the period 4:45 to 05:00, and the mean time between 5:45 to 6:00. If the difference between these two values is the same or less HR is counted in SS.
Calibration

NOTE!
Calibration can only be done from the display!

- Zero the scale, see "Scale - Zero adjustment"
- Release the brake belt tension by lifting the pendulum over 0.5 kp (the motor starts).
- (The brake belt tension can also be loosened by running the engine manually. This is done by pressing (-) in the calibration mode.)

Press START STOP and PROGRAM for 2 seconds to enter calibration mode.

Press START STOP
and PROGRAM for 2 seconds to enter calibration mode.

Check the potentiometer value at 0 kp

Move the pendulum to the value and hold it still until the potentiometer value stabilized

Press ENTER for next step

Repeat according to the pictures to the right

Next calibration point

Two short beeps are heard and the calibration is finished.
The bike is ready to use.

If you have started the calibration mode but change your mind, you can press the START STOP button to exit without saving.
(However, if you press ENTER the calibration process has begun and must also be completed.)

Manual motor control
By pressing the (+/-) button in the calibration mode, the motor can be run manually if rpm is less than 30. This is to ensure the functioning of the engine for service or support, and to release the brake belt tension.

= Tightens brake belt
= Slackens brake belt

Current potentiometer value

For best flexibility we recommend a potentiometer value between 40 and 60 at 0 kp.

Error message: CalErr - if the value is outside the window.

NOTE!
Potentiometer values shown in the photos are examples only, varies depending on the potentiometer value at 0 kp.

Fig: Display 'Calibration mode'
1) Bike model
2) Current potentiometer value
3) START STOP
4) ENTER
5) Software version
6) Hours in use
7) Cycle constant (1.00)
8) Calibration point
9) PROGRAM
Scale - zero adjustment

Connect power to the bike. Loosen possible tension in the brake belt by moving the indicator to 0.5 kp. Hold it there until the belt feels loose. Then move the indicator to 0 again. Now check if the indicator is aligned with the 0-index on the scale.

If adjustment is needed, 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 pointer. Tighten the lock nut after the adjustment. See Fig: Scale adjustment.

Mechanical 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 the following:

- First, follow the steps in the “Scale - zero adjustment”. Adjust the pendulum if necessary.
- Loosen the calibration hook from the hook bracket, see Fig: Calibration mode.
- A checked and approved weight(4), 4 kg (Art. No: 9000-211), attached to the calibration hook (5), see Fig: Calibration. Note! The calibration hook should always be left in the hook control.
- If the calibration is correct, the indicator should point to 4 kp on the scale.
- Lift off the weight and replace the calibration hook in the hook bracket, see Fig: Normal mode. Note! The hook must be inserted in the holder during operation.

If there is a deviation, adjust the pendulum to the right position on the scale by adjusting the weight inside the pendulum (2). To do this the left cover must be removed.

To adjust the position of the weight, the locking screw, in the center of the pendulum(3), must be loosened.

If the pointer shows too low, the internal weight must be moved upwards. If the pointer shows too high, the adjustment weight is moved down. This process is repeated until pointer is in the correct position.

Check the calibration of the pendulum weight once a year or when needed.
Personal data can be set for estimated HR (default HR is 185). See "Personal settings".

To end the Training program, press START STOP and the results are displayed on three pages.

'Quick start' can be used as a separate program. (If START STOP is pressed, the TRAINING program is activated.)

The program is active and starts with base power, adjust with (+/-) button. No time is counted so the test person can warm up, use it as a 'quick start' or train without logging any values.

Press ENTER (for 5 seconds during the test) and a new test is started with the same settings.

Press START STOP (for 5 seconds during the test) and the test is reset.

The power is adjusted with (+/-) button, press and hold for quick adjustment. The power can be set between 15 and 700 W in 5 W steps.
During the test METS and l/min are continuously counted and displayed.

**Calculation**

METS values are displayed and calculated from the current workload. The two VO₂ values displayed during the test continuously calculate the average value for 5 seconds.

The formula used (values from ASTRAND original table) to calculate VO₂ at different workloads is:

\[
0.2333 \text{ l/} 1000 \text{ kpm} = 0.01428 \text{ L/W (2.8 l/min at 1200 kpm)}
\]

This is according to Astrand’s table between 150 W and 300 W, and a good approximation for 15-700 W and a cadence of about 50-65 rpm.

**References / Literature:**

- Astrand P-O, "Ergometri - konditionsprov", Monark, Sverige
- Astrand I, "Aerobic work capacity in men and women with special reference to age", Acta Physiol Scand. 49 (suppl. 169), 1960
Astrand
(Except 928 G3r)

Set weight

Weight kg 75

Set gender

Woman
Man

Set age

Age 35

Set max HR

The meter suggests an estimated max HR based on your age (220-age) Change if desired.

Max HR 185

Start Astrand program

If Steady State is reached the test stops after 6 minutes. If not, the test continues until Steady State is reached or the time reaches 12 minutes. After 6 minutes, the test can also be stopped manually.

Press ENTER (for 5 seconds during the test) and a new test is started with the same settings.

Press START STOP (for 5 seconds during the test) and the test is reset.

It is recommended not to adjust the braking power after the first three minutes.
The test is automatically stopped after six minutes if Steady State (SS) is active. If not, the test continues until SS is reached or the time reaches 12 minutes.

Steady State (SS) is checked by comparing the average HR during the period 4:45 to 5:00 with the average HR during the period 5:45 to 6:00. If the difference between these two average values is the same or less considered SS.

When the test is completed the results are calculated and shown directly in the display.

You can stop the test manually after six minutes by pressing START STOP even if SS is not active (an error message is shown). The result is calculated and displayed.

Explanations to error messages:

LO Hr The end pulse is too low and outside the Astrand tables so no results can be calculated.

HI Hr The end pulse is too high and outside the Astrand tables so no results can be calculated.

Err Another reason why no results can be obtained.

No SS The test is cancelled manually without SS after 6 minutes or no SS at time 12 minutes.

References / Literature:
- Astrand P-O, "Ergometri - konditionsprov", Monark, Sverige
- Astrand I, "Aerobic work capacity in men and women with special reference to age", Acta Physiol Scand. 49 (suppl. 169), 1960
- Astrand P-O, "Experimental studies of physical working capacity in relation to sex and age", Munksgaard, Kopenhagen, 1952.
The test is automatic after it has been started. Two or three levels (6 or 9 minutes) run automatically according to the table on the next page.

After six or nine minutes the test stops automatically and the YMCA will stop flashing. The results are shown in the display.

You can stop the test manually after two levels (6 minutes) by pressing START STOP and the results are calculated if the values are within the tables.

If the test values are outside tables so that no results can be given, you will hear a long beep and an error message appears.

**Explanations to error messages:**

**LO Hr**  
The end pulse is too low and outside the Astrand tables so no results can be calculated.

**HI Hr**  
The end pulse is too high and outside the Astrand tables so no results can be calculated.

**Err**  
If the test is stopped manually too early, or other reasons that no results can be given.

---

**References / Literature:**

- Golding L. A, Myers C. R, Sinning W. E, Y’s way to physical fitness“, YMCA of the USA, Rosemont, IL, 1982

---

---
YMCA  
(Except 928 G3r)

Men:

Level 1:
HR: < 90 / 90 - 105 / > 105

300 kpm/min / 50W

Level 2:
HR: < 120 / 120 - 135 / > 135

900 kpm/min / 150W
750 kpm/min / 125W
600 kpm/min / 100W

Level 3:

1350 / 1200 / 1050 / 1200 / 1050 / 900 / 1050 / 900 / 1350 kpm/min
225 / 200 / 175 / 200 / 175 / 150 / 175 / 150 / 225 W

Women:

Level 1:
HR: < 103 / > 102

150 kpm/min / 25W

Level 2:
HR: < 138 / > 137 / < 123 / > 122

450 kpm/min / 75W
300 kpm/min / 50W

Level 3:

750 kpm/min / 125W
600 kpm/min / 100W
600 kpm/min / 100W
450 kpm/min / 75W

NOTE! The given HR values are at the end of each level.
The results are displayed on three pages that you switch between with the (+/-) button:

**End value**
- **TIME**
- **Heart rate RPM**
- **WATT**

**Min value**
- **TIME**
- **Heart rate RPM**
- **WATT**

**Max value**
- **TIME**
- **Heart rate RPM**
- **WATT**

**NOTE!**
If the meter does not get any rpm indication at start, the test stops. To restart, press ENTER.

Press ENTER (for 5 seconds during the test) and a new test is started with the same settings.

Press START STOP (for 5 seconds during the test) and the test is reset.

The test is stopped when:
- The cadence is <30 for more than 5 seconds
- When you press START STOP
- 700 W workload is achieved
About Increment test
Increment is a testing protocol, where the power is increased according to a predetermined schedule. An increment is used to see the HR increase in relation to the rising power. It is used in both submaximal to maximal tests to track the maximum capacity.

The test continues until the test manager or test person cancels the test.

Time for each step
Set the time (minutes:seconds) for each single step. Preset time setting the first time is 3 minutes.

Start power
Set the first power level.

Power increase per step (step)
Set the power increase between each step of 5 to 200 W. Last value is presented as default.

Test procedure
The display begins with the start power (which is specified in "Start Power") and begins the countdown to the next step. The display will increase the power at the specified power increase each time the set time has passed and a new countdown begins. At the same time you hear a beep.

The test is automatic after it has been started.

If the test is stopped because of the low rpm it starts automatically even if the rpm increases again.
PWC (Except 928 G3r)

**Set weight**
- Weight kg 75

**Set age**
- Age 35

**Set test level**
- P 150
  - The meter suggests a level based on your age and estimated max HR.

**Set power increment per step**
- 02:00
  - 25 Watt
  - Power increase (two set)
  - 25 W step 2 min / 50 W step 3 min

**Set start power**
- Init
  - 25 Watt

**The test continues until the selected HR level is reached**
- The program is automatic until the test HR level is exceeded.

**Stop PWC program**

The test is stopped when:
- HR level is reached (cool down starts)
- You press START STOP (if you press START STOP after the HR level reached the results are displayed)

To see the results that appear on each page, see the table on the next page.

The test can always be stopped manually by pressing START STOP. Then the display shows the analysis pages but “Err” is displayed instead of watts value and watts / kg results, if the test is stopped before the countdown started and only the complete step the data is displayed.

Press ENTER (for 5 seconds during the test) and a new test is started with the same settings.

Press START STOP (for 5 seconds during the test) and the test is reset.

The meter suggests a level based on your age and estimated max HR.

Power increase (two set)
- 25 W step 2 min / 50 W step 3 min

The test is stopped when:
- HR level is reached (cool down starts)
- You press START STOP (if you press START STOP after the HR level reached the results are displayed)
PWC test level
The meter suggests a level based on your age. Can be adjusted with (+/-) button.

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>P170</td>
</tr>
<tr>
<td>30-50</td>
<td>P150</td>
</tr>
<tr>
<td>&gt;50</td>
<td>P130</td>
</tr>
</tbody>
</table>

Power step
The display shows time 2:00 and power 25 W. Switch with (+/-) button to time 3:00 and power 50 W. Press ENTER to save.

Start power
The display shows "Init". Set the initial power of the first step between 25 and 400 W with 25 W steps. Default value is 25 W. Press ENTER to save.

How it works
At the end of each step calculated average HR during the last 15 seconds, a beep sounds, 25 W or 50 W is applied workload, and a new countdown starts. In the first five seconds of the next steps the display shows test time, workload and estimated average HR during the previous step. During these five seconds the values flash.

This continues until the 15-second average HR is higher than the target HR (130 / 150 / 170). Then the test is stopped, a beep sounds, the workload reverts to start power, the final 15 seconds of average HR is displayed. The text "COOL" is displayed and the six-minute countdown starts. A 15-second average HR is displayed after 1, 3 and 5 minutes of the countdown.

You can skip the "cool down" by pressing the START STOP and the results appear instantly.

Results
After "cool down" two quick beeps are heard and the meter calculates and displays the results. The results are displayed on several pages that you switch between with the (+/-) button:

<table>
<thead>
<tr>
<th>Page</th>
<th>Results that are displayed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results</td>
<td>Total test time (end time), chosen test, total kcal, target HR, calculated result ( W_{PT} ), calculated result ( W_{PT}/kg )</td>
</tr>
<tr>
<td>End value</td>
<td>Total test time (end time), chosen test, target HR (end value) and calculated value per step</td>
</tr>
<tr>
<td>Second last</td>
<td>Second last test time, chosen test, step HR and calculated value per step</td>
</tr>
<tr>
<td>...&gt;</td>
<td>Chosen test, step HR and calculated value per step</td>
</tr>
<tr>
<td>0:00</td>
<td>Test time, chosen test, start HR and calculated value per step</td>
</tr>
<tr>
<td>Cool 1 m</td>
<td>Time C1:00, chosen test and step HR</td>
</tr>
<tr>
<td>Cool 3 m</td>
<td>Time C3:00, chosen test and step HR</td>
</tr>
<tr>
<td>Cool 5 m</td>
<td>Time C5:00, chosen test and step HR</td>
</tr>
</tbody>
</table>

NOTE!
The displayed value for calories is the total estimated calorie consumption incl. "Cool down".

PWC target HR watt calculation:
The estimated watt value at target HR (WPT) is calculated from the following data:

\[
\begin{align*}
W_1 &= \text{Watts value set in penultimate step} \\
W_2 &= \text{Watts value set in the last step} \\
P_1 &= \text{15-second average HR at the end of the penultimate step} \\
P_2 &= \text{15-second average HR at the end of the last step} \\
PT &= \text{Target HR: 130, 150 or 170 beats / min} \\
\end{align*}
\]

Formula for the WPT:

\[
WPT = W_1 + (W_2 - W_1)x(P_1 - P_2)/(P_T - P_1) \quad [W]
\]

Relative WPT:

\[
WPT/\text{kg} = WPT/\text{Weight} \quad [W/\text{kg}]
\]

For further information please refer to the reference literature.

References / Literature:
- Dr. Theodor Stemper, Diplom-Sportlehrer
- ROST, R., H. HECK, W. HOLLMANN, Die Fahrzadargeometrie in der Praxis, Broschüre der BAYER AG
- STEMPER, Th.: Gesundheit - Fitness - Freizeitsport, Bund-Verlag, Köln 1988 (zu beziehen über SSV-Verlag, Hamburg)
# Troubleshooting guide

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Probable Cause / Corrective Action</th>
</tr>
</thead>
</table>
| The Display is not working            | • Check that there is power in the socket and that no fuse has blown.  
• If there is power in the socket but the display still does not work, contact the service centre.                                                                                                                                                                                                                      |
| No heart rate                         | • Check the chest belt (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 chest belt is positioned correctly on test person and tight enough. Check that the electrodes are wet, in difficult 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 chest belt on another known person who has a good pulse reading. |
| Uneven Heart rate                     | • Use an external unit, for example a HR watch, to check if it also indicates irregular pulse. If this is the case there are probably a disturbance in the room. The disturbance may be electronic fields from power cables, elevators, lamps etc. or other electronic devices which are too close (eg. cell phones). Move the bike to a different location in the room or change rooms. If an irregular HR remains it should be checked manually. If the HR remains irregular at work the person’s health should be examined. |
| There is a click noise when pedalling  | • The pedals are not tight. Tighten them or change pedals.  
• The crank arms is loose. Check, tighten.  
• The base bearing is loose. Contact your dealer for service.                                                                                                                                                                                                                                           |
| (increases with the weight)           |                                                                                                                                                                                                                                                                                                                                                                    |
| There’s a click noise and a squeak    | • Loosen the chain.                                                                                                                                                                                                                                                                                                                                                  |
| noise when pedalling                   |                                                                                                                                                                                                                                                                                                                                                                    |
| CalErr shows in the display           | • Incorrect calibration or not calibrated at all. Calibrate the Ergometer.                                                                                                                                                                                                                                                                                           |
| Pendulum pointer scrapes in the scale | • Try to bend the scale slightly inwards                                                                                                                                                                                                                                                                                                                            |
| Scale plate scrapes in the pendulum   | • Try to bend the scale plate slightly outwards                                                                                                                                                                                                                                                                                                                      |
| Problems with the computer software   | • Describe the problem in an e-mail (in English) and send it to the software developer HUR labs support: support@hurlabs.com                                                                                                                                                                                                                                           |
More information

References / Literature:

If you want to learn more about the different tests, information is available in the following literature.

- Astrand P-O, "Ergometri - konditionsprov", Monark, Sverige
- Astrand I, "Aerobic work capacity in men and women with special reference to age", Acta Physiol Scand. 49 (suppl. 169), 1960
- Golding L. A, Myers C. R, Sinning W. E, Y's way to physical fitness", YMCA of the USA, Rosemont, IL, 1982
- Dr. Theodor Stemper, Diplom-Sportlehrer
- Stemper, Th.: Gesundheit - Fitness - Freizeitsport. Bund-Verlag, Köln 1988 (zu beziehen über SSV-Verlag, Hamburg)
Service check and 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.
• Always keep the bike clean and well 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 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 (twice a 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 (2 times per year).
• Be sure that all moving parts, crank and flywheel are working normally and that no abnormal play or sound exists. 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.

Note! 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 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 not, however, refund costs for labour or shipping.
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 then be changed.

Flywheel bearing

The flywheel bearing is long-term greased and requires no supplementary lubrication. If a problem arises, please contact your Monark dealer.

Crank bearing

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

Transportation

During transport the brake cord 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 brake belt on pendulum bikes with engine, connect power to the unit and raise the pendulum to 4 kp. Hold it there until brake belt is loose. Please note how the belt is assembled. 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, 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 brake belt on the bike remove all tension. Please note how the belt is assembled. 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 potential covers and all workload on the brake belt and then remove it. Grind with a fine sand paper. 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 sand paper 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
Chain 1/2” x 1/8”

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) the chain must be tightened. Otherwise it will cause abnormal wear of the chain and sprockets. Therefore it is always recommended to keep the chain play as small 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 covers if required.

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. Then tighten the nuts on the hub axle again. See Fig: Chain adjustments.

To replace the chain, loosen the chain adjusters as much as possible. Dismantle the chain lock (6) and remove the chain. Use a pair of tongs for dismantling spring. 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 parallell with the centerline of the frame. Otherwise the chain and sprockets make a lot of noise and wear out rapidly.

Then assemble the removed parts as above but in reverse order.
Freewheel sprocket

When replacing the freewheel sprocket remove frame covers if necessary. Remove the chain according to section "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. Replace sprocket-adaptor and assemble the new parts in reverse order according to the above.

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.
## Spare parts list

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>9300-3</td>
<td>Flywheel, complete</td>
<td>14</td>
<td>1</td>
<td>9328-29</td>
<td>Scale lock, complete</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>9300-24</td>
<td>Flywheel suspension, complete</td>
<td>15</td>
<td>1</td>
<td>9328-62</td>
<td>Stop</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>9328-85</td>
<td>Brake belt, complete</td>
<td>16</td>
<td>1</td>
<td>9338-19</td>
<td>Stay</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>9328-94</td>
<td>Hook for calibration weight</td>
<td>17</td>
<td>1</td>
<td>9328-92</td>
<td>Adapter</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>9300-99</td>
<td>Pendulum stop, plastic</td>
<td>18</td>
<td>1</td>
<td>9310-55</td>
<td>Motor</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>9328-33</td>
<td>Adaptor M20/M16</td>
<td>19</td>
<td>1</td>
<td>9328-96</td>
<td>Bracket for servo</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>9328-91</td>
<td>Hook control</td>
<td>20</td>
<td>1</td>
<td>9328-1</td>
<td>Frame</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>9311-66</td>
<td>Pendulum, complete</td>
<td>1</td>
<td>9000-211</td>
<td>Calibration weight, 4 kg</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>9338-43</td>
<td>Brake belt release</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>9328-93</td>
<td>Holder pot. adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>9311-67</td>
<td>Potentiometer with cable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>9328-803</td>
<td>Plate with kp-scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>9000-105</td>
<td>Screw M5x10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>----------</td>
<td>--------------------------------------------------</td>
<td>------</td>
<td>------</td>
<td>----------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>9328-39</td>
<td>Frame cover, left</td>
<td>25</td>
<td>1</td>
<td>9309-3</td>
<td>Joint list</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>9328-4</td>
<td>Aluminium profile</td>
<td>26</td>
<td>4</td>
<td>9300-12</td>
<td>Screw M8x16</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>9328-38</td>
<td>Frame cover, right</td>
<td>27</td>
<td>1</td>
<td>9328-5</td>
<td>Support tube, front</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>5675-9</td>
<td>Screw M5x6,5</td>
<td>28</td>
<td>4</td>
<td>5845</td>
<td>Locking nut M8</td>
</tr>
<tr>
<td>5</td>
<td>21</td>
<td>5673-9</td>
<td>Screw M5x12</td>
<td>29</td>
<td>4</td>
<td>9328-26</td>
<td>Rubber foot</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>4994-5</td>
<td>Saddle</td>
<td>30</td>
<td>1</td>
<td>9328-131</td>
<td>Bushing f. saddle post</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>5605-1</td>
<td>Screw M8x46</td>
<td>31</td>
<td>1</td>
<td>9311-162</td>
<td>Display G3</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>5864</td>
<td>Washer</td>
<td>31</td>
<td>1</td>
<td>9311-163</td>
<td>Display G3r</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>5775</td>
<td>Nut</td>
<td>32</td>
<td>1</td>
<td>9000-105</td>
<td>Screw M5x10</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>9328-135</td>
<td>Saddle post</td>
<td>33</td>
<td>1</td>
<td>9328-196</td>
<td>Multicable 1850 mm</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>9328-132</td>
<td>Locking knob</td>
<td>34</td>
<td>1</td>
<td>9328-188</td>
<td>Power cable 2200 mm</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>9328-37</td>
<td>Transport wheel complete (pair)</td>
<td>35</td>
<td>1</td>
<td>9328-78</td>
<td>Handlebar, compl. with handles, clamp and locking handle</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>9328-6</td>
<td>Support tube, rear</td>
<td>36</td>
<td>1</td>
<td>9328-72</td>
<td>-Handgrip</td>
</tr>
<tr>
<td>14</td>
<td>4</td>
<td>9328-51</td>
<td>Plastic cap</td>
<td>37</td>
<td>1</td>
<td>5864</td>
<td>-Washer</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>8523-115</td>
<td>Screw M8x1x20</td>
<td>38</td>
<td>1</td>
<td>9127-37</td>
<td>-Spacer</td>
</tr>
<tr>
<td>16</td>
<td>2</td>
<td>8523-2</td>
<td>Dust cover for crank</td>
<td>39</td>
<td>1</td>
<td>9100-280</td>
<td>-Screw</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>9300-207</td>
<td>Foot straps (pair)</td>
<td>40</td>
<td>1</td>
<td>9328-2</td>
<td>-Handlebar clamp</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>9300-220</td>
<td>Pedal (pair)</td>
<td>41</td>
<td>1</td>
<td>9337-38</td>
<td>-Screw M8x16</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>9300-430</td>
<td>Steel crank set, complete</td>
<td>42</td>
<td>1</td>
<td>9328-183</td>
<td>Power adaptor</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>9371-16</td>
<td>-Magnet</td>
<td>43</td>
<td>1</td>
<td>9328-192</td>
<td>-Plug EUR</td>
</tr>
<tr>
<td>21</td>
<td>1</td>
<td>9326-55</td>
<td>Chain, 98 L with chain lock</td>
<td>44</td>
<td>1</td>
<td>9338-36</td>
<td>USB cable 3 m</td>
</tr>
<tr>
<td>22</td>
<td>1</td>
<td>8966-175</td>
<td>BB cartridge bearing</td>
<td>45</td>
<td>1</td>
<td>9328-150</td>
<td>Screw set</td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>8966-176</td>
<td>Support casing for BB-bracket</td>
<td>46</td>
<td>1</td>
<td>9311-75</td>
<td>Chest belt, Garmin ANT+</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
<td>9311-161</td>
<td>Sensor with cable 150 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>