MANUAL

828

EN

MONARK EXERCISE

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. 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: https://monarksportsmed.com/

MONARK EXERCISE

FOR LIFE AND PERFORMANCE

Product Information

Congratulations on your new ergometer!

Monark 828 is an ergometer cycle intended for aerobic testing, rehabilitation and exercise in professional environments such as health care, occupational health and sports medicine.

The ergometer uses Monark's Manual Pendulum System (MPS). Braking force is generated via a brake belt around the flywheel and is set manually with the workload lever, which moves the pendulum on the kp scale.
The braking force is always read in kilopond (kp) on the pendulum scale.
In combination with the 20 kg flywheel and the 4 kg calibration weight, this allows verification and adjustment of the workload according to the instructions in this manual.

The Novo Duo display is a monitoring and data display unit. It shows pedal revolutions per minute (RPM), heart rate in beats per minute (when an ANT+ chest belt is used), exercise time (TIME), cycling speed (SPEED), distance (DISTANCE) and power (WATT) based on the set braking force and pedalling rate. The display does not control resistance. Resistance is always adjusted on the ergometer with the workload lever.

The frame is constructed in steel with an upright riding position. Saddle and handlebar are adjustable vertically and horizontally to enable correct positioning of the test person or user.

Each 828 is 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, please read the instruction for "Calibration" in this manual.

Technical data power adaptor

Input voltage: 100–240 V AC; 50–60 Hz; 1.4–0.7 A
Output voltage: 12 V DC; 5.0 A; 60 W max.
Polarity: + in the middle, *see Fig: Polarity.*

Fig: Polarity

Facts

- Pendulum system, easy to verify
- Large, well-balanced flywheel 20 kg (44.1 lbs)
- Monark upright frame
- Adjustable saddle and handlebar
- Low step-through for easy access
- Novo Duo monochrome touchscreen display
- Connectivity via BLE (FTMS) and ANT+ (FE-C)
- Designed for aerobic testing, rehabilitation and education

Width
520 mm (20 in)

Length
1240 mm (49 in)

Height
1100 mm (43 in) at handlebar
Recommended user height: >150 cm (>59 in)

Weight
55 kg (121 lbs)
Max user weight: 180 kg (397 lbs)

Serial number

The serial number is placed on the frame according to *Fig: Serial number.*

Always state the serial number when contacting Monark Exercise or your dealer regarding service, spare parts or support.

Fig: Serial number

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.

Installation of Support Legs

When the cycle is delivered, the support legs must be installed before use. The cycle is equipped with one front support leg and one rear support leg.
See Fig: Overview support legs

Front support leg

The front support leg is installed using two pre-mounted M8×25 carriage bolts and two M8 flange lock nuts. These are already installed on the ergometer and NOT in the bag attached.

Position the support leg over the carriage bolts and tighten the flange lock nuts from underneath.

The square neck of the carriage bolts locks into the frame, so no counter-holding is required from above.
See Fig: Front support legs

Rear support leg

The rear support leg is installed using two M8×25 carriage bolts and two M8 flange lock nuts supplied loose in the accessory bag.

Insert the carriage bolts from the top through the frame and the support leg, then install the flange lock nuts from underneath.

Tighten securely until the support leg is firmly fixed to the frame. *See Fig: Rear support legs*

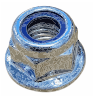
Tools

A 13 mm spanner or socket wrench is recommended for tightening the flange lock nuts, as it provides proper control and correct tightening torque.

After installation, ensure that both support legs are securely mounted and that the cycle stands stable on a level surface.

× 4

carriage bolts



× 4

flange lock nuts

Fig: Overview support legs

1) Front support leg
2) Rear support leg

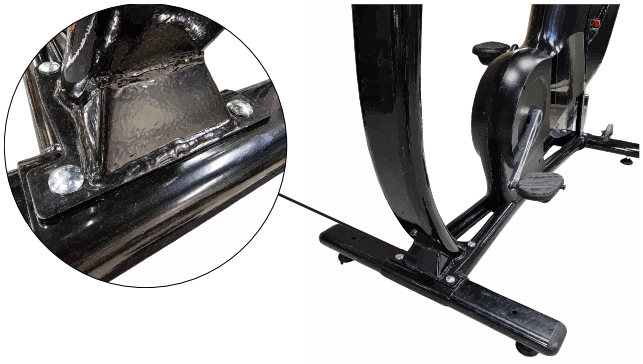


Fig: Front support legs

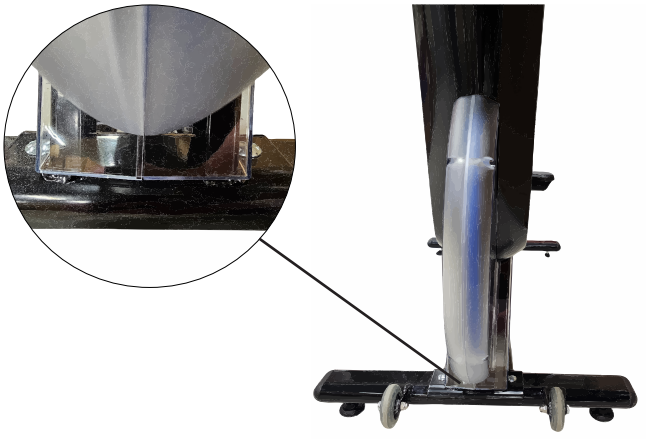


Fig: Rear support legs

Operating Instruction

Workload adjustment

When the user pedals, the flywheel rotates and is braked by a brake belt running around the flywheel and connected to the pendulum system.

Workload is set manually with the workload knob.
See Fig: Workload device (1).
Moving the knob changes the position of the pendulum along the kp scale and thereby the tension in the brake belt.

The braking effect can be changed by changing the pedalling speed (RPM), and/or moving the workload lever until the pendulum shows the desired kp value on the scale.

When the pendulum indicates a given kp, the braking force is kept essentially constant, independent of cadence.

Power measurement

The ergometer is designed to measure power at the flywheel, which is the reference used in established test protocols
(for example Åstrand submaximal tests).

The Novo Duo display calculates power (WATT) from the braking force set on the pendulum (kp) and the measured pedalling rate (RPM).
When RPM changes at a fixed kp, the displayed watt value changes accordingly.

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 in the bottom position. To adjust the seat height loosen the handle on the seat tube.
See Fig: Adjustments (1)

The handlebar setting should be in a comfortable position when cycling. During longer exercise sessions it is recommended to occasionally change handlebar position. To adjust the handlebar, loosen the quick release handle (2).
See Fig: Workload device.

Fig: Workload device
1. *Workload knob*
2. *Locking handle, handlebar*

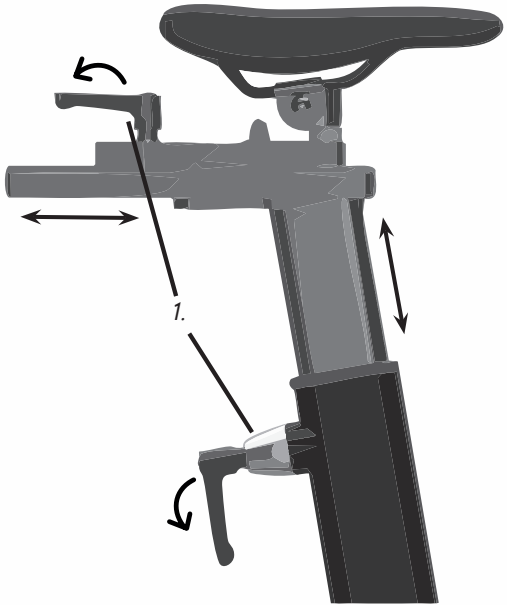


Fig: Adjustments
1. *Locking handle, saddle*

Validation

The following procedure ensures that the bike works for daily use.

- Check the HR function if you use chest belt.
- Check the braking force by putting on a certain workload and check that the load is applied.
- Test by pedalling and check that a reasonable RPM is obtained - verify by a clock.
- Feel if the pedals move smoothly. Listen for unusual sounds. Adjust if necessary.
- Adjust the handlebar and saddle and make sure they are securely attached and that the adjustment is working properly.
- Make sure the support legs are in position by rocking the bike. Tighten if necessary.

If something unusual is found during the daily inspection that you cannot resolve, please call customer service.

Connection to external platforms

Monark 828 can transmit training and test data wirelessly to external devices and software platforms.

BLE (FTMS): Transmits power, cadence/speed and other training data.

ANT+ (FE-C): Transmits FE-C data for external monitoring.

Heart rate: Receives HR data from compatible ANT+ chest belts.

Pairing is initiated from the external device or app by searching for the ergometer and selecting it in the device list.

Resistance is always adjusted on the ergometer with the workload lever and pendulum scale.

The USB-C connection is used only for power from a power bank and cannot be used for data transfer.

NOTE!
External systems can receive and log data from the 828. They cannot control the resistance.

All workload changes must be performed on the ergometer using the manual workload lever and the pendulum scale.

Meter instructions

Novo Duo display

The ergometer is equipped with a Monark Novo Duo display *see Fig: Display.*

The display shows real-time data, including:

- **RPM –** Pedal revolutions per minute
- **TIME –** Time: HH:MM:SS
- **SPEED –** Km/h
- **DISTANCE –** Km
- **KP / WATT –** Workload / Power
- **ENERGY** – kCal (*See Section "Calories"*)
- **HR** – Heartrate when a chest belt is connected

START

STOP

PAUSE

SETTINGS

BACK

ANT+ (FE-C)

BLE (FTMS)

To start the display, press the On/Off button on the right side of the bike. When the display is on:

Start a session by pressing "start"
Pause by pressing "pause"
Reset the current session by pressing "stop"

The timer starts automatically when the pedals are moved.

Fig: Display

Fig: view 1

Fig: view 2

Display view

The Novo Duo has several viewing modes.
To change which data fields are shown, swipe with your finger to the right or left on the touchscreen.
See Fig: Display views (View 1–4).

NOTE!
Do not expose the electronic display to direct sunlight or extremely high temperatures.
Do not use solvents when cleaning, only a dry cloth.

Fig: view 3

Fig: view 4

ANT+/BLE

When the display is connected to an external device, the ANT+ / BLE symbol is displayed in the upper right corner. *See Fig: Ant+ and BLE*

Fig: ANT+

Change units

It is possible to switch between kP and watt.
You do this by going to “Settings” and selecting Kilopond or Watt as “primary unit”.
See Fig: Change Units

Sleep mode

After ten minutes of inactivity, the display goes into sleep mode. To restart the display, press on the screen or start pedalling.

Calories

The energy cost of exercise on the ergometer is usually expressed in kilocalories (kcal) or kilojoules (kJ).

For Monark calibrated ergometers, a standard relationship often used for interpreting aerobic work is: 1 minute at 100 W ≈ 7 kcal.

This can be used as a guideline when converting measured power (W) and time (TIME) from the ergometer, or from external software, into an estimate of total energy expenditure.

Fig: BLE

Display ANT+ and BLE connection

The Novo Duo offers a wireless connection through BLE and ANT+ (trough FTMS and FE-C protocol) and creates new opportunities to connect to 3rd hand applications (T.ex. Zwift or Kinomap).

To be able to connect your ergometer to an device using BLE or ANT+, start searching for the ergometer on yourdevice: Turn your ergometer on, after starting the search.

It may take up to one minute before the device to find the ergometer. Please note that the ergometer can only be connected to one BLE device at a time.

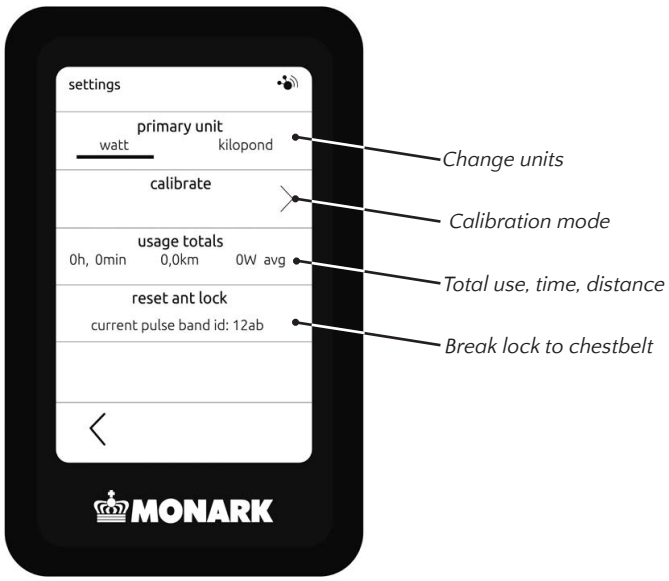


Fig: Change units

Heart rate (ANT+)

The user's heart rate can be measured with a chestbelt that detects the pulse of the heart.
For the heart rate to show in the display you need to use a heart rate sensor with ANT+.
For a correct measurement of the heart rate you need to position the sensor correctly and that the skin is clean and moistened.

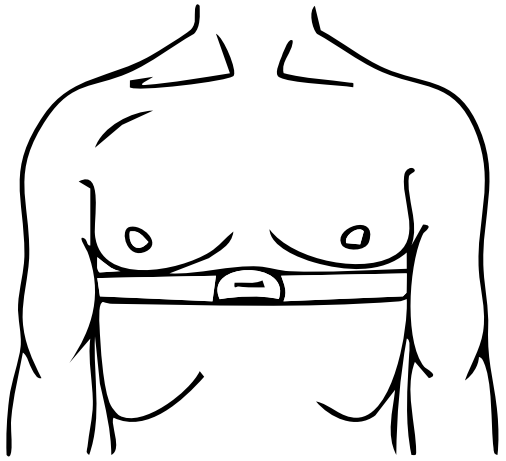


Fig: Placement chest belt

Scale adjustments

Turn on the power to the ergometer.
Release any tension in the brake belt by lifting the pendulum / pointer to slightly over 4 kp.

Hold the pendulum in this position for a few seconds, then move it down again. Check that the pointer conforms to the zero index. If the pointer is not in zero, the scale must be adjusted.

First, loosen the locking screw and then change the position of the scale so that the 0-index is in line with the pointer.

Tighten the screw after adjustment. *See Fig: Zeroing*.

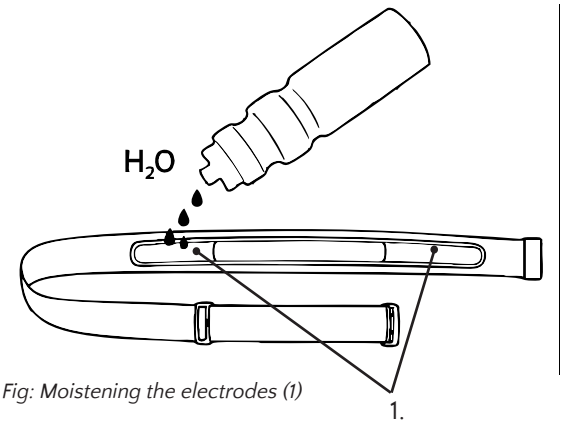


Fig: Moistening the electrodes (1)

Fig: Zeroing
1) Locking screw (white screw)

NOTE!
It is important that you are very precise when you adjust or reset the scale.

Calibration

Calibration is necessary so that the electronic and the mechanical parts of the ergometer match.

Usually it is not necessary to recalibrate the ergometer electronically, but it should be done after each service, change of electronic part, movement or if you adjusted the 0-index.
New calibration automatically replaces the old.

Pendulum calibration

1. Remove the right-hand service cover (not the cover with the pendulum scale).
   See Fig: Calibration 1

2. Check that the pendulum pointer indicates zero (0 kp) when the pendulum is hanging freely straight down.
   See Fig: Calibration 2
   If the pointer does not indicate zero, refer to section "Scale adjustment" before continuing. (Page 11)

3. Disconnect the brake belt from the spring and hang the calibrated 4 kg weight in the spring instead.
   See Fig: calibration 3

4. When the 4 kg weight is applied, the pendulum pointer shall indicate 4 kp on the scale.
   See Fig: Calibration 4
   If the pointer does not indicate 4 kp, the pendulum weight must be adjusted, see section "Adjustment of pendulum weight" and see Fig: Screw for adjusting weight in pendulum. (Page 14)

5. When the correct value is obtained, remove the 4 kg weight and reconnect the brake belt to the spring.

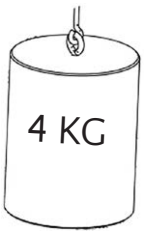
6. Make sure that the brake belt is correctly positioned on the surface of the brake wheel and has not slipped beside it.

7. After completing the mechanical calibration of the pendulum, an electronic calibration must be performed, see section "Electronic calibration".

Check the calibration of the pendulum once a year or when needed.

NOTE!
When calibrating the pendulum you need a 4 kg calibration weight.

The flywheel must be completely still before the weight is hung on!



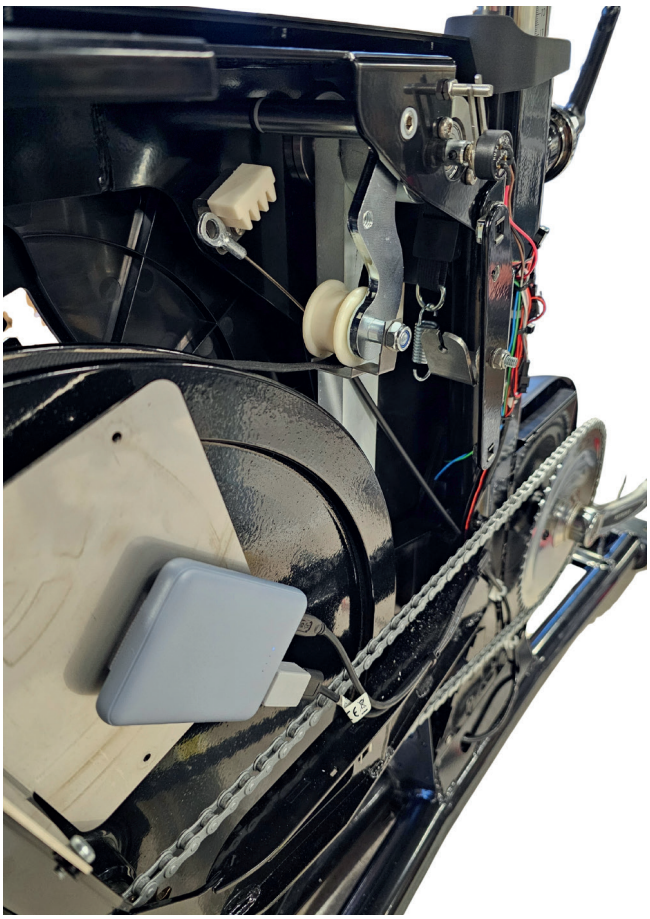


Fig: Calibration 1

Fig: Calibration 2

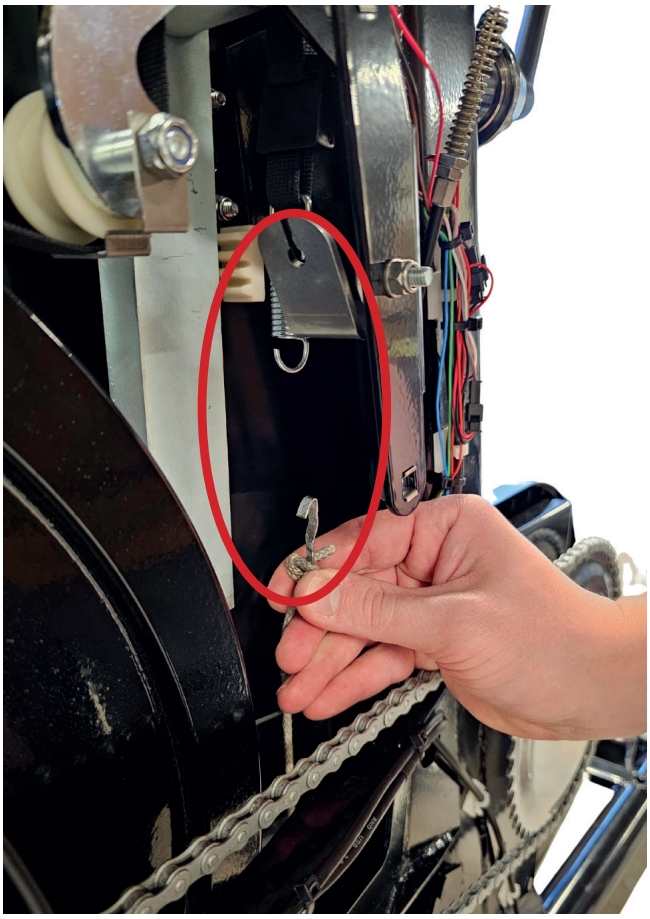


Fig: Calibration 3

Fig: Calibration 4

Adjustment of Pendulum Weight

To adjust the pendulum weight, use the Allen key supplied in the tool kit.

Loosen the small locking screw to release the large adjustment screw located inside the pendulum. Do not remove any screws.

Adjust the large screw until the correct pendulum weight is obtained:

- Pendulum screw protruding further out = heavier pendulum
- Pendulum screw positioned further in = lighter pendulum

When the correct setting is reached, secure the adjustment by tightening the small locking screw.

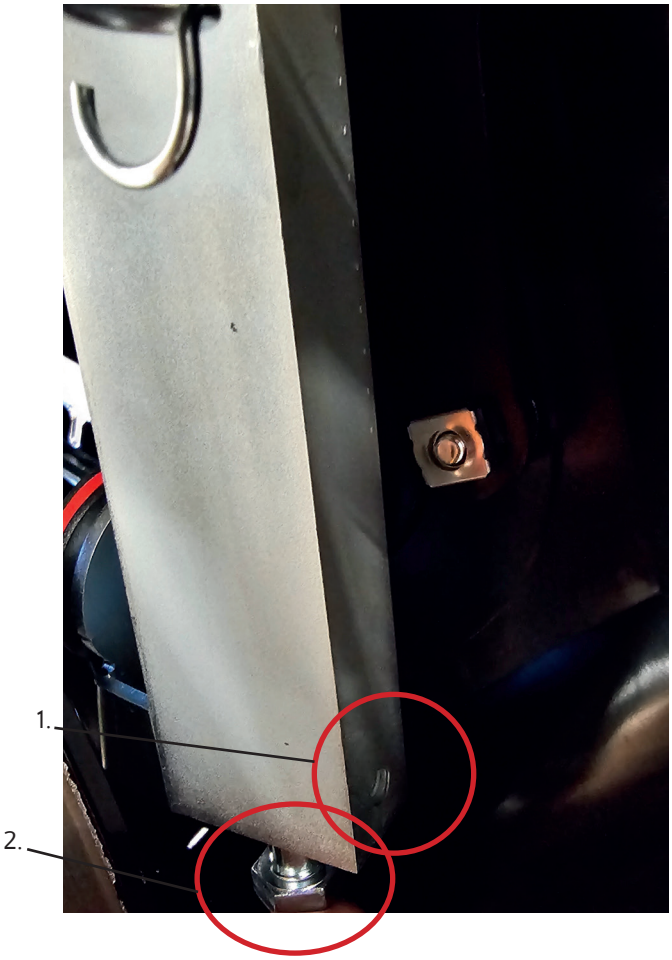
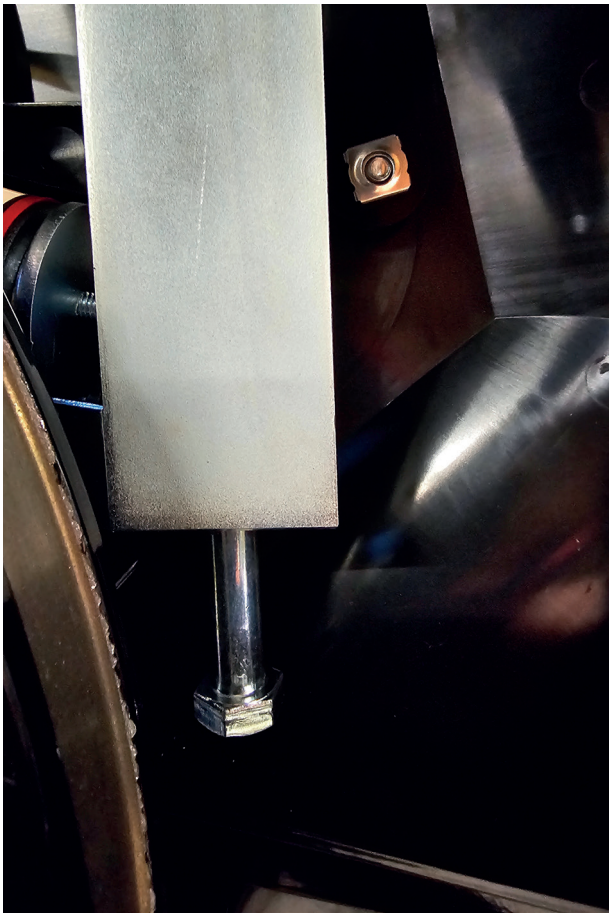
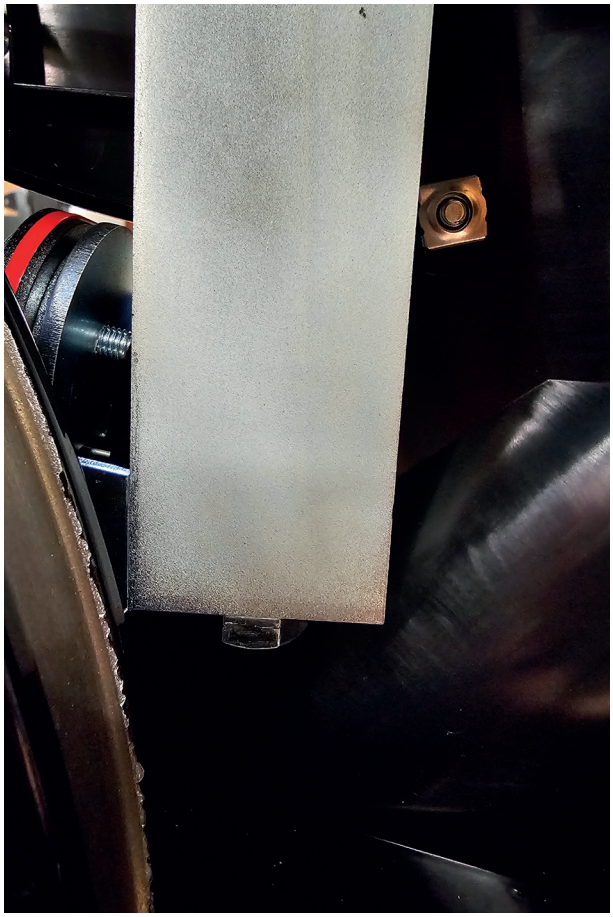


Fig: Screw for adjusting weight in pendulum

1) Locking screw for pendulum
2) Pendulum screw



heavier pendulum



lighter pendulum

Calibration electronics

Electronic calibration can only be done from the display!

Calibration should be done after service, replacement of electronics part, if you have moved the bike or if you have adjusted the scale.

Start by adjusting the scale, see section, and release the brake band tension.

1. Press “Settings” on the display.
   Then you select “calibrate”.
   See Fig: Settings and Fig: Calibrate
2. Then “0 kp” is shown in the display.
   let the pendulum hang free over 0 and then press the screen. *See Fig: 0 KP*
3. Then “2 kp” is shown in the display.
   Hold the pendulum to 2 and then press the screen.
   See Fig: 2 KP
4. Then “4 kp” is shown in the display.
   Hold the pendulum to 4 and then press the screen.
   See Fig: 4 KP
5. Then “6 kp” is shown in the display.
   Hold the pendulum to 6 and then press the screen.
   See Fig: 6 KP

The calibration is complete!

Fig: Settings

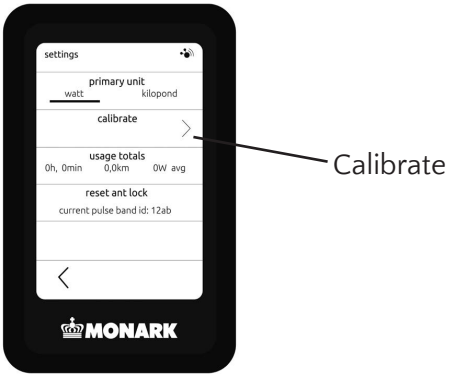
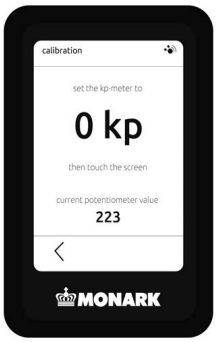


Fig: Calibrate

NOTE!
The pendulum must be kept still at the different positions. This is done by pressing down the pointer into the groove on the scale at each kp value.



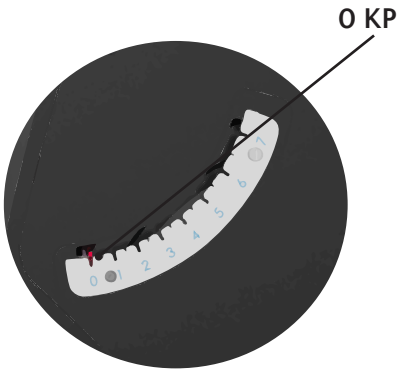
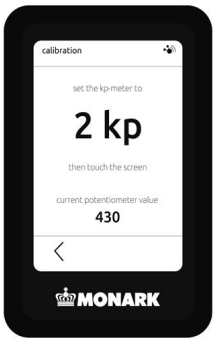


Fig: 0 KP



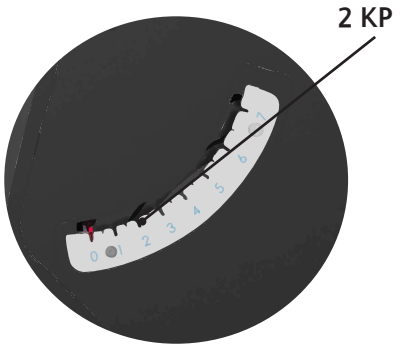
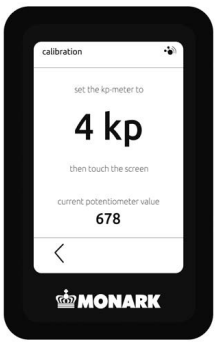


Fig: 2 KP



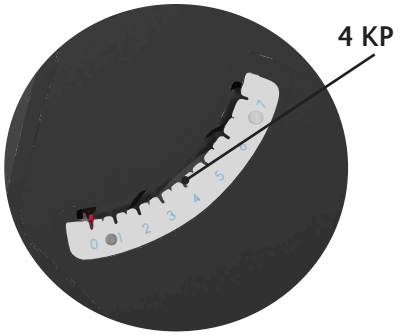
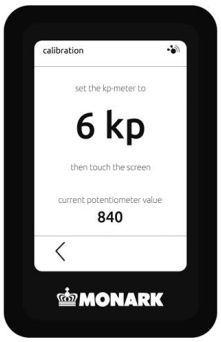


Fig: 4 KP



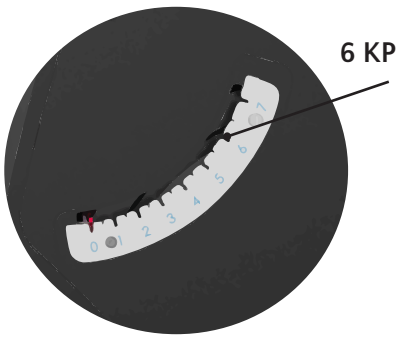


Fig: 6 KP

NOTE!
The potentiometer values shown in the pictures are only examples. The value varies depending on the value of the potentiometer at 0 kp.

Troubleshooting guide

Symptoms	Probable Cause / Corrective Action
There is a click noise when pedalling (increases with the weight)	• The pedals are not tight. Tighten them or replace the pedals if necessary. • The crank is loose. Check the crank fixing and tighten. • The bottom bracket bearing is loose. Contact your Monark dealer for service.
Scratching sound is heard when pedalling	• Check that the transport / carriage block has been removed. • Check that none of the covers are touching the flywheel, crank or other moving parts. Adjust or tighten the covers so they do not interfere.
There's a click noise and a squeak noise when pedalling	• The chain is too tight or dry. Loosen the chain slightly and lubricate it. See Fig: Chain adjustments.
The display is not working	• Check that the power bank is charged and correctly connected to the USB input on the bike. • Check that the On/Off button on the bike has been pressed and restart the display. If the display remains off, disconnect and reconnect the power bank and check all cables and connectors. Contact your Monark dealer if the problem persists.
Time counting does not start.	• Check if the brake belt is too tight or incorrectly positioned so the magnet does not pass the speed sensor. This will result in no signal from the sensor and the timer will not start. • Adjust the brake belt and sensor according to the instructions (see section on brake belt / sensor adjustment). A video is available on the website which shows this procedure.
No connection to external device (BLE / ANT+)	• Verify that Bluetooth / ANT+ is enabled on the external device and that the app supports FTMS and/or FE-C. • Start pedalling and confirm that the Novo Duo display is on before searching for the ergometer in the app. • Remove any previous pairing for the ergometer in the app and try to connect again. Only one BLE device can be connected to the ergometer at a time. • If the problem remains, restart both the bike and the external device and test with another compatible app or device.
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 ohm meter 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. • Check that the chest belt is positioned correctly 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 chest belt on another known person who has a good pulse reading. • Check that heart rate display is active on the Novo Duo display and that no other nearby device is already connected to the same belt.
Irregular heart rate	• Use an external unit, for example a HR watch, to check if it also indicates an irregular pulse. If this is the case, there is 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. 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.

Service

Note that the text about service and maintenance is universal and that all parts may not be relevant to your bike.

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 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 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.

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.

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.
Removing the right service cover to see the best area to come in contact with the brake belt.
See Fig: Brake belt contact surface

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".

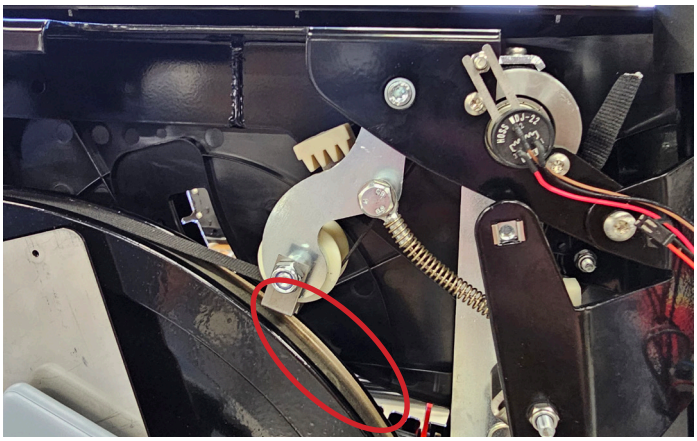


Fig: Brake belt contact surface

Chain 1/2“ x 1/8“

Check the lubrication and chain play at regular intervals. Measure in the middle of the chain's free length. The chain should have a minimum play of 3–10 mm (1/4”). *See Fig: Chain adjustments.*

When the play is about 20 mm (3/4”), the chain must be tightened. Otherwise it may cause abnormal wear of the chain and sprockets.
Therefore, it is always recommended to keep the chain play as small as possible within the recommended range.

If the chain has become so long that correct chain play can no longer be achieved, the chain is worn and must be replaced. To adjust or replace the chain, remove covers if required.

To adjust the chain, the axel nuts (3) should be loosened. Loosening or tightening the nuts on the chain adjusters (2) will then move the hub and axle forward or backward. Then tighten the nuts on the hub axle again (3) to lock it in place.
See Fig: Chain adjustments 2.

It´s very important that you change equally on each side of the flywheel if the flywheel is cenered already. If not, adjust the flywheels position by tightening the axe nuts accordingly.

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.

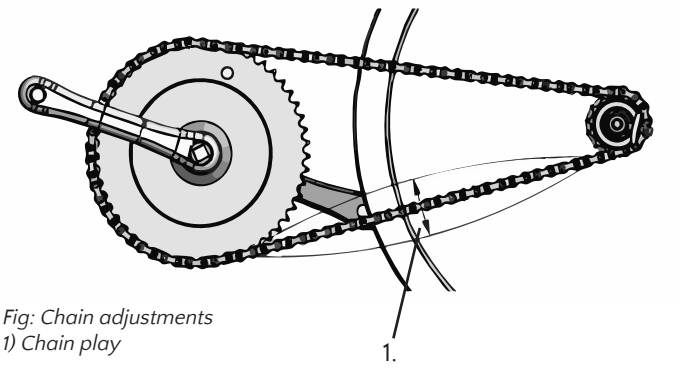


Fig: Chain adjustments
1) Chain play

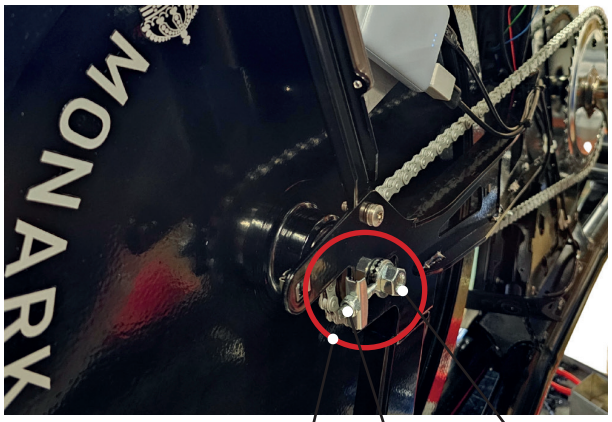
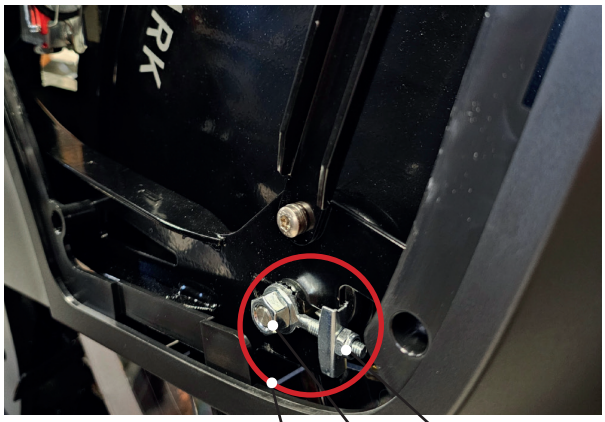


Fig: Chain adjustments 2
1) Chain adjuster
2) Chain adjuster nuts
3) Axle nuts



From the left side
1) Chain adjuster
2) Chain adjuster nuts
3) Axle nuts

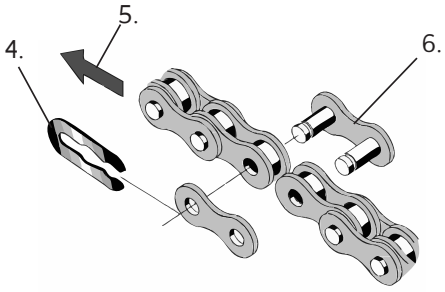


Fig: Chain replacement
4) Lock spring
5) Movement direction
6) Chain lock

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.

NOTE!
Do not tighten the axle nut completely. It must be possible to loosen the sprocket-adaptor 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.

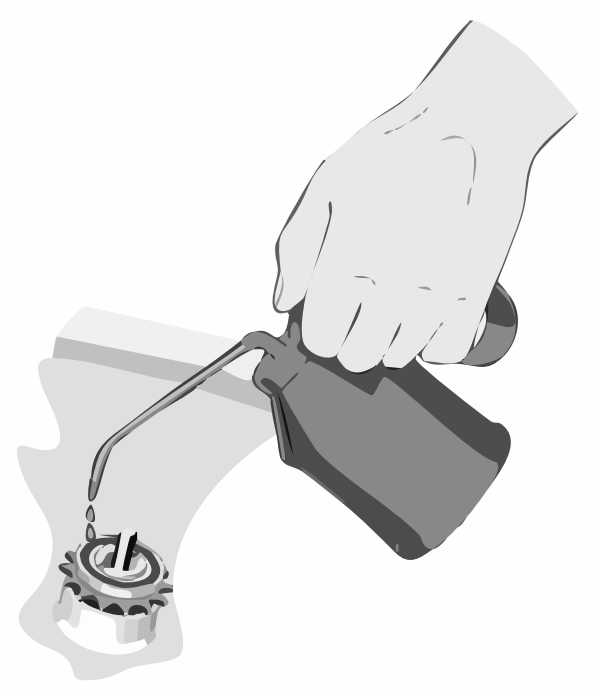


Fig: Lubrication

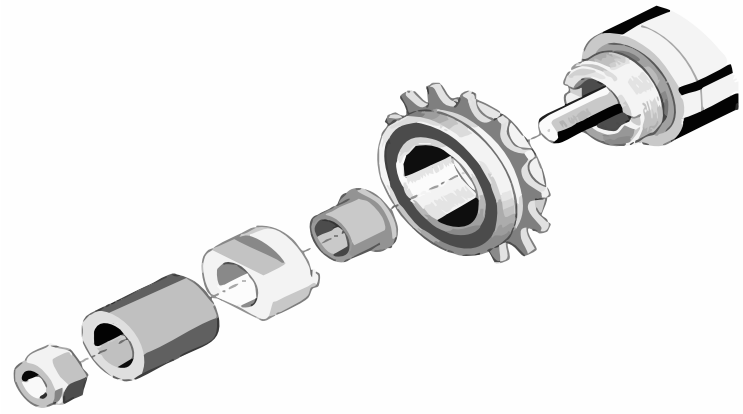


Fig: Hub assembly

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