manual

h/p/cosmos discovery 4.0

Instruction- & Service manual

h/p/cosmos discovery 4.0

Firmware version 3.01.3

Manufacturer

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Introduction

Dear customer,

we would like to express our gratitude for putting your trust in us, in deciding for this high-quality ladder ergometer. Since 1989 we have been developing and manufacturing running machines and ladder ergometer for sports and medical application. When it comes down to technology, design and safety, we have set extremely high standards for ourselves. Only this way we can ensure the quality from which you profit.

Because the ladder ergometer is a motor-driven device, you should pay special attention to the mentioned safety regulations. If proper notice is taken of the safety regulations the operation of our devices is almost without any risk. The neglect of the safety regulations could result in dangerous situations. Therefore please read the installation and operation manual and the danger precautions before taking the device into operation.

Simple maintenance can easily be done by yourself. We recommend to call our competent service team or entering into a maintenance contract for a routine service in an interval of 6 or 12 months.

A form for registration of your institution and device is included in the delivery. In order to be able to supply you with the latest technical information and service, it is important for you to fill out the form. Therefore please fill out the form for registration immediately and send it back via fax.

The instruction manual as a firm part of the delivery has to be accessible for the user at any time. This instruction manual has been written with great care. Should you, however, still find any details, which do not correspond with your device, please give us notice, so that we can correct any mistakes as soon as possible. Subject to change, errors and omissions excepted. E & OE.

We wish you a lot of fun and success while exercise and working with your ladder ergometer.

the

Franz Harrer President h/p/cosmos sports & medical gmbh

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Safety

A Danger precautions

For usage of ladder ergometers:

- The ladder ergometer is used at one's own risk.
- Use ladder ergometer only under supervision of your doctor or/and trainer.
- It is not allowed to use the ladder ergometer without a supervisor.
- Do not
 - step onto the machine before the motor is switched off and the speed on the display is 0.0
 - start the machine before you are at least at the second rung from the ground
 - climb below the second rung from the ground
 - stop moving when the ladder is still moving (Press the STOP button before you stop moving)
 - turn round during exercise
 - jump off while climbing

- use the machine if you think there is a technical defect of the machine or the pulse measuring system

- stop only if in danger or in danger of falling
- Attention! Dangerous capture area at the end of the ladder ergometer and at any other moving part of the machine.
- Please make sure, that, in the case of a fall, subjects with long hair, wide clothes, jewellery, etc. do not get caught in capture area or at any moving part of the machine.
- Children and animals are not allowed to use the ladder ergometer and should not get near to it.
- Interrupt the training immediately if you start feeling sick or dizzy and see your doctor.
- Subjects with a cardiac pacemaker or who suffers from any kind of physical restriction should see a doctor before using the ladder ergometer.
- The subject must be secured while performing a maximum endurance test.
- Please keep a safety area of 2,5 meters in front of the ladder ergometer.
- Explicit warning of improper use.
- Ensure that the power connection cable is installed proper and safely and that nobody can stumble or fall over the cable.
- Pay attention to further safety regulations and operation instructions in the appendix of this instruction manual.
- Do not drink and eat any lubrication material and no other material or parts of this device, and keep all lubrication material and all other parts away from children and animals.

These safety regulations are to be displayed within sight of the ladder ergometer.

The safety regulations and dangers have to be pointed out to every user.

The manufacturer does not undertake any liability for any injury to persons or damage to property.

B General Instructions / Safety

This instruction manual is part of the device and should always be accessible.

Exact observance of the instruction manual is a requirement for the appropriate operation of an h/p/cosmos device.



This sign reminds you of paying attention to the enclosed information and to the manual. It also reminds you of concerns which have to be considered for measurements and connection with other devices.

The safety of your subjects and the compliance to the mentioned accuracy of measurement can only be guaranteed, if the consumption goods, sensors and detectors, described in the instruction manual, are being used.

Absorption-, cleansing- and disinfecting chemicals are only to be kept in the appropriate reservoirs. At the connection of gas pressure container it has to be examined about its MOT-admissibility (TÜV) first. Pull the plug before cleansing or disinfecting electric devices.

We guarantee for the safety. reliability and function of its devices only if

- installation, extension, alteration and repair is performed by authorized people
- the room for installation corresponds to the DIN and VDE installation directives.
- the device is plugged in at a socket with a protection system.
- the room for installation corresponds to the requirements of the surroundings for the device.
- the device after the instruction is being used in accordance with the instruction manual.

The entry of fluid into the device has to be removed immediately by the authorized customer service and a safety examination has to be performed. Damaged socket connections, wires and pressure control switches have to be replaced instantly by trained personnel or by authorized persons.

C Instructions for Safety and Operation

The following directives correspond to the in the Federal Republic of Germany acknowledged safety model. Please consider that there may be national discrepancies for other countries.

C1 Electric Safety

Safety Classes

In order to protect the athlete and the training personnel the association of German electrotechnicians Inc, (VDE) has published special directives for medical used rooms and electromedical devices.

Devices with a power supply therefore have to, in order to prevent the passing on of the mains voltage over to touchable metal pieces, be equipped with not only a reliable isolation of the parts being under voltage but also additional safety precautions. The VDE-association divides it into so called safety classes.

Of the, for electro-medical devices, licensed safety classes are mainly used the safety class I (i.e. safety precautions with protective wiring), and the safety class II, (i.e. safety measures without protective wiring but with double isolation): Devices of the safety class I are devices, where the metallic casing-parts are connected with the protective wire of the line net via the safety contact. In the case of an isolation error the inserted fuse element switches off.

Subject's Surroundings

The surroundings of the subject should have a gap of 1.5 m as it has been proofed by experience; this has been laid down here as the surrounding.



Subject's surroundings

Protection against the Danger of Electrical Shocks

Casing and cover:

Parts of non-medical electric devices within the surrounding of the subject, which, after having taken off the coverings etc. without the use of tools for a routine maintenance etc., are in touchable reach, have to operate with a voltage that does not exceed 25 volt alternate voltage and 60 volt direct voltage, which is produced by a separate source as described in IEC 601-1.

Do not touch such a part and the subject at the same time!



Electric devices in rooms

According to this example the leakage current would flow from the electric device to the earthened athlete via the trainer.

C2 Environmental Requirements

Ladder ergometers are not to be used in medically utilized rooms with a danger of explosions or in easily inflammable atmospheres. The devices should not be installed near to e.g. an x-ray device, motors or transformer with high connection power, as the electric and magnetic interference can falsify measurements or even make them impossible.

High voltage lines should be avoided.

If not stated otherwise in the delivery information the devices are designed for operation in normal climatic surroundings (DIN IEC 601-1):

Temperature: $+ 10^{\circ} \dots + 40^{\circ} C$ Relative humidity: $30 \dots 75 \%$ Air pressure: $700 \dots 1060 mbar$

The ladder ergometer has to be protected from high humidity. Venting slots are not to be covered; otherwise it would hinder the air circulation. Store the devices at a temperature of -20° ... + 50° C.

D Symbols used

All symbols used comply with the according norms IEC 417 and IEC 878.



Alternating current (AC)

Protection ground

Earth

Potential compensation

Please pay attention to the accompanying instructions

Devices of the type B

Dangerous electric voltage

E Safety standards

E1 VDE Norm

The ladder ergometers, designed for professional use, are produced according to strict safety- and quality controls.

The ladder ergometers for the professional application in sports and fitness have been built corresponding to the DIN EN 60335-1 (VDE 0700) guidelines.

The ladder ergometers for the professional application in the medical area have been built corresponding to the DIN EN 60601-1 (VDE 0750) guidelines.

E2 The **C**-Mark

The **C** \in -mark on the nameplate of the sports and fitness ladder ergometers confirms the compliance to the EC- directive 89/336 EWG appendix I (EMC electromagnetic compatibility). The audit has been conducted after the criterion of jamming and interference immunity.

E3 The **CE 0123**-Mark

The CE_{0123} -mark on the nameplate of the Running-Machine for medical application confirms the compliance to the EC-directive 93/42 EWG (Medical-Device-Directive).

F Field of Application

F1 Professional Application in Sports and Fitness

The ladder ergometers designed for sports and fitness have not been tested for application in medical areas and therefore are not qualified for that field of application.

You can apply these models in the following areas:

Endurance training

F2 Professional Application in the medical field

The ladder ergometers designed for professional application in the medical field are also qualified for sports and fitness use as well as for application in the medical field.

You can apply these models in the following fields:

- Endurance training
- Endurance tests and EMG-measuring with the subject in the laboratory
- Ergometry (Exercise- ECG and Ergospirometry)
- Recreational fitness training

G Forbidden Use

- The ladder ergometer must not be used without being carefully instructed by specialist staff and without having received notes on the safety regulations!
- Children must only use the ladder ergometer if a medical doctor keeps them under constant supervision.
- If the test subject complains about nausea or dizziness, the training is to be terminated immediately and a physician is to be consulted.
- Subjects with cardiac pacemakers and test subjects with weakened health must consult a physician before.
- The ladder ergometer must not be used for animals.
- Improper use, i. e. the ladder ergometer is used for an other purpose than mentioned under "Fields of Application".

Starting up

A Transport, unpacking and packaging

When receiving the machine in a crate or unpacked, make sure the machine and/or the packaging is not damaged. If you discover any damage make a note on the packing-list / delivery note of the carrier.

The manufacturer does not undertake any liability for any damage which is not reported immediately on the packing-list / delivery note.

Before you unpack the machine read instructions on the crate.

Make sure that the machine, power connection cable or any optional equipment will not be damaged during unpacking.

In order to avoid any damages most of all Running-Machines are being transported and installed by the manufacturer or an authorized carrier. If delivered by the manufacturer the packaging will be taken back and recycled.

If the Running-Machine is being delivered by a carrier, you can recycle the packaging yourself or send it back to the manufacturer (transportation is to be paid by the customer).

Often a recyclable transport tool or packaging is included in the extent of delivery. Ask your dealer and the carrier to take the packaging and the recyclable transport tool back to your dealer or to h/p/cosmos at your own costs. In some cases a credit note can be granted.

B Mechanical installation

- In order to ensure proper installation and safety, either the manufacturer or an authorized service crew should always perform transport and installation of the devices.
- For reasons of safety please make sure that there is a safety zone of 2.5m in front of the ladder ergometer.
- Put an aerobic mat (or something similar) in front of the ladder ergometer to protect the subject when falling.
- Put the device on a rubber mat as large as the device to protect the floor from dust and scratches, to ensure a firm stand and to reduce noise.
- The provided space for the Running-Machine should be even and horizontal.
- If the Running-Machine is installed safely and horizontal, it can be plugged in (see installation instructions) and taken into operation.

C Electrical Installation

Attention!

If there is a voltage drop of more than 50 % it is normal that the ladder ergometer switches off. In this case the machine stops slowly. To restart the device you have to switch it "ON" again.

- Read the nameplate of the machine before connecting the machine to the power outlet, just in case the machine was designed for special voltage supply (e.g. 110 Volts and 25 Ampere)
- As standard, a usual power supply of 230 Volt / AC, 50/60 Hz is sufficient for the ladder ergometer.
- Use a usual 16 Ampere expulsion fuse (with B-tripping circuit). If however, the expulsion fuses switch off when starting the device, the circuit has to be secured with a blowout fuse or an expulsion fuse with another tripping-circuit (e.g.: K–fuse). Read name of the machine just to make sure!
- For further questions please ask your electrical engineer.
- Before installing the ladder ergometer please compare the specifications on the nameplate concerning the mains voltage and the mains frequency with your local characteristics. Connection only if identical!
- Check the main lead before plugging it in. Damaged leads and couplers have to be exchanged immediately. Rubber-leads can get porous and friable after some years.
- Plug in the ladder ergometer into the wall socket directly.
- Each ladder ergometer has to be connected to a separate circuit.
- The use of an extension cable or a multiple plug socket is not allowed.
- If the equipment is used in the field of medicine, first connect the potential equalization with the corresponding plug pin (next to the main switch at the front) and then connect the mains plug.

In case the UserTerminal was disassembled during transport please connect the cables according to following illustration:



D Operation

D1 Switching the device on

In order to be able to switch on the device, you may have to unlock the Emergency-stop switch first by turning it around (to the left hand side or right hand side, see symbol).

To start the machine, the expulsion fuse on the lower left side of the ladder ergometer has to be switched on: ${}_{\text{sl}}{}^{\text{\tiny H}}$

Switch on the Running-Machine by using the green "ON" or ",I"-key at the lower front side of the ladder ergometer. The indicator light within the key is glowing. (If the indicator does not flash up, please check the power supply, the expulsion fuse and the Emergency-stop.)

D2 Switching the device off

- Do not switch the device on or off within less than 1 min. Otherwise it could lead to interference in the adjustment of the motor or to the failure of the backup.
- The models for medical application with the isolation transformer have an inrush-current limiter (surge guard). Too short switch on / switch off intervals will lead to a deactivation of the inrush current limiter and results in an overload of the circuit fuse.
- For the professional use, where the devices are often being used daily, we recommend to switch on the devices in the morning, and leave it in the stand-by mode during the day.
- Switch off the Running-Machine by pressing the red "O"-key at the lower front side of the ladder ergometer.. The indicator within the key is extinguished.

E The Emergency-Stop / Emergency-Off

When in danger of falling or in any emergency case please press the red button of the Emergencystop at the UserTerminal.

In order to switch on the device again, unlock the Emergency-stop by turning it (to the left hand side/ right hand side see symbols).

Ladder ergometers for sports and fitness will be ready for operation immediately (pay attention to the display).

Ladder ergometers for medical application have to be switched on with the green "I"-key again. Before switching it on again, however, wait for at least 1 minute. As mentioned above "Switching the device off".

- Use the Emergency-stop only if in danger!
- The Emergency-stop is not to be used as a normal stop-key

Operation

A UserTerminal Keyboard and Display

If your ladder ergometer has no UserTerminal (no display, no keyboard), it can only be controlled via interface RS 232 (e.g. via ECG, Ergospirometry, PC with Software h/p/cosmos para graphics or h/p/cosmos para control).

To use all the functions described below and for maintanence and service we recommend the PC Software h/p/cosmos para control (Freeware).

It is possible for these models to purchase an UserTerminal as optional equipment, which is connected to the ladder ergometer via interface RS 232.

- Do not lean on the UserTerminal
- Do not put any pressure on the display
- Press the keys softly. As confirmation you will hear a beeping sound



UserTerminal keys and displays

A1 The keys

Кеу	Basic function		
- + •	 Selection of mode (Manual, Profile, Cardio, Test) Alteration of parameters (speed, elevation, a.s.) Selection of options 		
DOWN UP	Alteration of elevation		
SET	 Confirmation of mode (Manual, Profile, Cardio, Test) Confirmation of parameter (speed, time, pulse, a.s.) Confirmation of options (measuring unit) Start (of selected mode) 		
STOP	StopDiscontinuance of operation		

The keys may also have special functions within different modes. See the instructions Manual mode, Profile Mode, Cardio Mode and Test Mode.

A2 The Display

The display consists of 6 four digit LCD-displays, which show speed, exercise period, (energy consumption and wattage in turns), exercise distance, steps / rungs and heart rate.

Next to the LCD-displays you will find light-emitting diodes (LED) in addition, which supply information about mode, measuring unit and so on.

Flashing displays indicate

- I interference / error
- alterable parameter (LCD)
- select option (LED)

The indicated values remain, after stopping the ladder ergometer, until ...

- ... the mode (Manual, Profile, Cardio, Test) has been changed
- I ... the display has been initiated by pressing the ee -key once more.

If the ladder ergometer has been stopped by reducing the speed with the -key ("PAUSE"-position), then the display continues with the previous values after starting again.

A3 The display (standard configuration)

LCD-Inscription	Display	LED	Inscription	Display	Definition
SPEED	Speed	\otimes	max m/min	m/min	1
		\otimes	km/h	km/h	0,1
		\otimes	m/s	m/s	0,1
		\otimes	mph	mph	0,1
DISTANCE	Distance		m	m	0,1
		\otimes	km	km	0,1
		\otimes	miles	miles	0,1
	Time			mm:ss	1
				hh:mm	1
ELEVATION	Steps / rungs		Step	steps	1
PROGRAM	Program sequence	\otimes	Step		1
	Program number	\otimes	No		1
	Energy consumption		KJ	KJ	1
ENERGY POWER	Wattage		Watt	Watt	1
	MET		MET	MET	1
HEART RATE	(max.) Heart rate		^	1/min	1
SEX AGE WEIGHT	min heart rate	\otimes	$ \mathbf{\Psi} $	1/min	1
	Age	\otimes	years	years	1
	Weight	\otimes	Kg	kg	1

Explanation

LED an ⊗ LED aus

B Mode of operation

- The ladder ergometer is equipped with 4 modes of operation: Manual, Profile, Cardio and Test. Some of the modes of operation can also be changed online into another while the ladder ergometer is in operation.
- Select the mode first (see 4 LED) with or and confirm the mode with
- The incorporated series interface RS232 is always active. This means, that you can send and receive data/commands at any time (parallel) and during any mode. Always the latest command will be executed. No matter if the command came via RS232 interface or from the UserTerminal during one of the 4 modes.
- 7 different acceleration levels and deceleration levels are available for all modes and for remote control via RS232. For more information about maximum acceleration level and minimum acceleration level see chapter: User Options / Optional Functions.

Acceleration-level	Total time from 0 to max. speed
1	131 s
2	66 s
3	33 s
4	16 s
5	8 s
6	5 s
7	3 s

B1 Manual mode

Start: Ladder is not moving. One of the modes of operation is flashing: (Manual, Profile, Cardio, Test)

Select operational mode manual



Alteration of the mode (Manual, Profile, Cardio, Test) until Manual is flashing

Start operational mode Manual



A) In case of deactivation (standard) in the optional functions

- LED Manual is glowing.
- LED % is glowing.
- LED KJ is glowing, changing with LED Watt.
- ladder ergometer accelerates up to the pre-selected starting-speed (standard: 0.5 km/h, can be changed in the optional mode)
- Start of measuring.
- Display indicates present Heart Rate: P. 40 ... P. 220. The Display indicates every single heart-beat with a flashing dot behind the P.
- All other displays indicate the actual values.

B) In case of activation in the optional functions:

- Display means indicates: 65 flashing (for 65 kg body weight) and LED Weight is glowing,
- in order to enter with i or i and i the body weight for an accurate calculation of the POWER and ENERGY consumption.
- Further steps see A)

Alteration of speed



Speed is being increased / reduced (0-max.).If Speed is being reduced down to "0"= Pauseposition:

Display indicates: PAUS

Alteration of acceleration and deceleration level for speed



Press several times and then hold

e.g. 2x acceleration or deceleration level: 2 (limited by the max. acceleration level selected in the Optional Mode).

Pause mode



If Speed is being reduced down to "0" = Pause-position

- Display indicates: "PAUS"
- Ladder ergometer stops.
- All Displays stop.

When restart with $[]{}{}{}{}{}$ or $[]{}{}{}{}{}{}{}{}{}{}{}{}$ all Display values will be "added".

UP- & DOWN buttons



In the manual mode the buttons UP and DOWN are not in operation.

Switch over to the next mode or one mode back

and then in addition

Switch (Jump) over to the next Mode or jump to the previous Mode. This is a perfect way to change to other Modes without stop of the belt.

Stop running belt



ladder ergometer stops. (Deceleration time can be adjusted in the optional functions)

B2 Automatic Mode

The automatic mode is for starting a training profile, a heart rate dependant speed control or a test profile.

Caution: The ladder ergometer belt will start moving automatically and the speed will be changed automatically after one of the 3 modes (Profile, Cardio, Test) has been started.

You and all other users need to get familiar with the details and risks of these modes (e.g. the max. speed of these modes) for not facing the danger of too high speeds and injuries.

Profile Mode / Pre-programmed training profiles

Profile-mode offers 3 different programs, which, with the help of various speed combinations, simulates easy running training as well as a cross-country run.

In case of activation (standard deactivated) in the optional functions: The maximum speed and the duration of the 3 profiles can be selected ("scaled"). Standard set-up is without scaling, for quicker and easier access.

All of the 3 profiles are predefined and cannot be changed in the memory. For creating your personal profile: Test No 21 ... 24 are user defined (free programmable Profiles)

Start: ladder ergometer is not moving. One of the modes of operation is flashing: (Manual, Profile, Cardio, Test)

Select operational mode profile



Alteration of the mode (Manual, Profile, Cardio, Test) until Profile is flashing

Start operational mode profile



- LED Profile is glowing.
- LED SPEED max. is glowing.
- LED PROGRAM No. is glowing.
- Display indicates: max. speed in this profile.
- Display indicates: time in this profile.
- Display indicates: Profile No 1.

Select profile no. 1 ... 3



- LED Profile is glowing.
- LED SPEED max. is glowing.
- LED PROGRAM No. is glowing.
- Display indicates: max. speed in this profile.
- Display indicates: time in this profile.
- Display indicates: Profile No 1 ... 3.

Start operational mode profile: The selected profile no. 1 ... 3



A) In case of deactivation (standard) in the optional functions:

- LED Profile is glowing.
- LED % is glowing, changing with LED Step.
- LED KJ is glowing, changing with LED Watt.

ladder ergometer accelerates up to the starting-speed of the first program step, according to the "table of programs". 5 seconds before the next program step there is an acoustic countdown. Start of measuring. All displays indicate the actual values. The belt stops automatically according to the profile duration. The ladder ergometer can be stopped at any time with the help of ⊖

B) In case of activation in the optional functions:

- Display indicates: SC. 3 flashing (for Profile scaling "1 ... 6")
- Display indicates: max speed according to the scaling (for max. speed in this profile)
- LED SPEED max. is glowing
- Display indicates: Time according to the scaling. (for duration of this Profile)
- In order to enter with ↓ or ↓ and ↓ the scaling (max. Speed, Time and Distance). Herewith you can create more variations out of the 3 standard profiles.
- continue with A)

Stop ladder ergometer



ladder ergometer stops. (Deceleration time can be adjusted in the optional functions) For a better documentation we recommend to use a printer linked to the serial interface RS 232 or/and to use an external PC with the software h/p/cosmos para graphics[®].

Possibilities of interfering into the profile mode manually

A profile can be changed on-line, but not in the memory location. For personal profiles use test-profiles no. 21 – 24

Start: Operational mode: Profile, running-belt is moving.

Alteration of speed



Alteration of the Speed is only online for this single step. The Speed can not be changed in the memory. Speed is being increased / reduced (0-max.).

If SPEED is being reduced down to ",0" = PAUSE-position.

Alteration of acceleration and deceleration of speed



press several times and then hold

e.g. 2x acceleration or deceleration level: 2 (Limited by the max. acceleration level selected in the Optional Mode: standard value=4)

Pause Mode = Interfere a program step



- Display indicates: "PAUS"
- ladder ergometer stops.
- All Displays stop.

When restart with restart or restart all Display values will be added.

Buttons DOWN & UP



In the profile mode the buttons UP and DOWN are not in operation.

Switch over to the next program step or one program step back



Jump over to the next Program Step. or Jump to the previous Program Step.

Switch over to the next mode or one mode



Jump over to the next mode or jump to the previous mode. This is a perfect way to change to other modes without stopping the ladder ergometer. For example to start Manual Mode for a "Cool-Down" period without stop of the ladder ergometer.

Profile outline

The following schedule contains the standard values, if the profiles have not been scaled. Activation of the scaling function see in the optional functions.

Profile 1 Endurance-interval	SPEED m/min	min
for beginners		
Warming up	6,5	4,0
High 1	9,0	0,5
Low 1	6,5	3,0
High 2	9,0	0,5
Low 2	6,5	3,0
High 3	9,0	0,5
Low 3	6,5	3,0
High 4	9,0	0,5
Low 4	6,5	3,0
High 5	9,0	0,5
Low 5	6,5	3,0
High 6	9,0	0,5
Low 6	6,5	3,0
		25 min

Profile 2 Endurance interval standard	SPEED m/min	min
Warming up	7,2	5,0
High 1	9,0	3,0
Low 1	7,2	2,0
High 2	9,0	3,0
Low 2	7,2	2,0
High 3	9,0	3,0
Low 3	7,2	2,0
High 4	9,0	3,0
Low 4	7,2	2,0
		25 min

Profile 3 Progressive intervall	SPEED m/min	min
Warming up	10,1	4,0
High 1	11,5	2,0
Low 1	10,1	2,0
High 2	13,0	1,0
Low 2	10,1	2,0
High 3	14,4	1,0
Low 3	10,1	2,0
High 4	13,0	1,0
Low 4	10,1	2,0
High 5	11,5	1,0
Low 5	10,1	2,0
High 6	11,5	1,0
Low 6	10,1	4,0
		25 min

B3 Cardio mode

Heart-Rate-dependant training control ("pulse-control"cardio-training)

- Pay attention to the safety instructions according to the instruction manual.
- Interrupt the training immediately if feeling sick or dizzy and see your doctor.
- The automatic training control must not be activated if interference occurs during the wireless transmission of the Heart-Rate (or if an interference is suspected).
- Use this mode only after having been instructed by competent staff.

Field of application / Control

The Cardio Mode controls the ladder ergometer so that the Heart-Rate of the subject stays within a predefined zone.

The following parameters can be programmed:

- The desired max. Heart-Rate (pulse) during the training.
- The desired min. Heart-Rate (pulse) during the training.

The ladder ergometer starts and increases or decreases the speed automatically to keep the heart rate within the pre-selected heart rate zone.

If the ladder ergometer does not receive a heart rate signal it will run down speed to 2km/h, a beeper alert signal will be activated, and the running-belt stops after 2 min.

Attention!

If you change from another mode of operation into Cardio mode while the ladder ergometer is in operation it will adapt to the actual speed.

The ladder ergometer approaches the pre-selected training-rate according to the decision-matrix suggested and tested by the University of Sports in Magglingen (Switzerland):

Heart rate difference	Speed	Time
actual > < set value		
> 50 bpm	2,0 m/min	20 sec
> 30 bpm	1,0 m/min	15 sec
> 15 bpm	0,5 m/min	10 sec
> 5 bpm	0,2 m/min	10 sec
> 3 bpm	0,1 m/min	10 sec

Operation of Cardio Mode

The Cardio-Training cannot be performed without a POLAR chest belt and transmitter.

Start: ladder ergometer is not moving. One of the modes of operation is flashing: (Manual, Profile, Cardio, Test)

Select operational mode Cardio



Alteration of the mode (Manual, Profile, Cardio, Test) until Cardio is flashing

Confirm operational mode Cardio



- LED Cardio is glowing.
- LED Years is glowing.
- Display indicates flashing: 35 (for the subject's age)

Select personal age



- LED Years is glowing. Display l 100 (for the age)

Confirm personal age



- LED **↑** is glowing
- Display indicates flashing: The suggested max. level of the heart rate. Calculated with the formula: 180 minus age

Important:

According to your health condition and according to the advises of your medical doctor you can/must change this level. If no changes required confirm the value with

Change upper level of heart rate



- LED **↑** is glowing.
- Display indicates flashing: max. level of the heart rate.

Confirm upper level of heart rate



- L
- LED ↓ is glowing. Display 🛄 indicates flashing: The L suggested min. level of the heart rate. Calculated with the formula: max. level of heart rate minus 10.

Change lower level of heart rate



LED $\mathbf{\Psi}$ is glowing.

Display indicates flashing: min. level of the heart rate.

Confirm lower level of heart rate and start of the cardio training

START
ENTER
₽

- Iadder ergometer starts from 0 up to a speed of 2 m/min.
- LED Cardio is glowing.
- LED ↓ or ↑ is glowing, indicating that the present heart rate is too low or too high.
- Display indicates present Heart
 Rate: P. 40 ... P. 220. The display
 indicates every single heart beat with a flashing dot behind the P.
- Speed of the ladder ergometer is controlled automatically (see separate table).

Stop ladder ergometer



ladder ergometer stops. (Deceleration time can be adjusted in the optional functions)

For a better documentation we recommend to use a printer linked to the serial interface RS232 or/and to use an external PC with the Software h/p/cosmos para graphics[®].

Possibilities of interfering with the Cardio Mode manually

Starting position: Operational mode: Cardio. ladder ergometer is moving.

Alteration of speed



- Display indicates: 0 max. Speed of the machine.
- Speed is being increased / reduced (0max.). If SPEED is being reduced down to ",0" = PAUSE-position:
- Display indicates: PAUS

Pause mode

Interfere the Cardio mode



- Display indicates: PAUS
- Ladder ergometer stops.
- All displays stop.
- When restart with raise all display values will be "added".

Buttons DOWN and UP



In the profile mode the buttons UP and DOWN are not in operation.

Changing the max. level of heart rate



- LED **↑** is glowing.
- Display ^{merrand} indicates: The max. ↑ level of the Heart Rate
- The min. ↓ level of the Heart Rate is automatically changed within the selected range.

Switch over to the next mode or one mode back



Jump over to the next Mode. or Jump to the previous Mode. This is a perfect way to change to other Modes without stop of the belt. For example to start Manual Mode for a "Cool-Down" period without stop of the ladder ergometer.

B4 Test Mode and free program profiles

- Some test profiles (e.g. CONCONI-test, STEP-test, etc.) are endurance tests (max. load and max. Heart Rate tests) and should only be performed after consultation of a medical doctor and under supervision of trained staff.
- Proper warm-up and cool-down periods have to be considered.
- For all endurance tests, make sure that the subject is safe at all the time!

Test Profiles / Field of Application

Test-mode can perform several different (pre-defined and self defined) tests.

All test profiles only make the load control. There is no automatic evaluation done by the ladder ergometer. The evaluation has to be done by host equipment (e.g. ECG, Ergospirometry, etc.) or external PC Software (e.g. h/p/cosmos para analysis)

Test no.	Definition of Test / Profile	Comment / Programming	
2	Graded Test	Endurance Test (max. Load Test) with the parameters Start speed Step length in min:sec. Increment / Step height Accelereration level Break time in min:sec (e.g. for determination of anaerobic threshold by means of taking blood samples during the load- brakes and lactate analysis with external lactate analysing equipment.	
		 Standard load profile Start speed: 8 m/min, must be changed according the conditions of the subject Step length: 3 min. (can be changed) Increment: 2,0 m/min (can be changed) Acceleration level: 4 (adjustable from 1 to 5) Break Time: 30 sec. (can be changed) STOP must be activated manually by the medical doctor. 	

Test no.	Definition of Test / Profile	Comment / Programming		
3	Conconi-Test	Endurance Test (max. Heart Rate Test) (e.g. for determination of anaerobic threshold via Heart Rate curve of the subject)		
		 Standard load profile: Starting Speed: 8 m/min, must be changed according the conditions of the subject Circuit (Lap length): 10m (can be changed) Increment: 0.5 m/min (can be changed) STOP must be activated manually by the medical doctor when the subject is fully exhausted. 		
10	Ramp Profile	 Ramp Profile with 2 parameters: Target speed: Standard: 10 km/h; adjustable from 0 to maximum speed of the ladder ergometer. Time for reaching target speed in seconds: Standard: 10 seconds; adjustable from 0 to 99 seconds 		
11 - 20	not engaged / reserved	For following extensions and up-dates		
21	free definable user profile	max. 10 Program steps / not scaleable		
22	free definable user profile	max. 10 Program steps / not scaleable		
23	free definable user profile	max. 10 Program steps / not scaleable		
24	free definable user profile	max. 10 Program step / not scaleable		

Further profiles can be created via an external PC and software h/p/cosmos para graphics.

Test Selection / Operation

Starting position: ladder ergometer is in standby mode. LED mode is flashing.

Select Mode Test



until LED Test is flashing

Confirm Mode Test



Display indicates Program No: " Pr. 1 " is flashing

Select Test Number



- Display indicates Program-No "Pr.
 1" ... "Pr. 24" is flashing.
- LED Nº is glowing

№ 01 ... 10 predefined № 11 ... 20 reserved № 21 ... 24 user defined (free programmable Profiles)

For a better documentation we recommend to use a printer linked to the serial interface RS232 or/and to use an external PC with the Software h/p/cosmos para graphics.

Confirm Test-Program



Display and reaction depend on the selected type of Program / Test-Profile

Stop Test-program and running-belt



ladder ergometer stops. (Deceleration time can be adjusted in the optional functions)

Programming-example: free definable profile

- Programming and correction of a free programmed test is possible in Test Mode , Pr. 21" up to ,Pr. 24".
- Start of a free programmed test is also possible in Test Mode "Pr. 21" up to "Pr. 24".
- The below listed Program Profile is supposed to be available on storage facility Test Mode "Pr. 21" and therefore it has to be created on Test Mode "Pr. 21" according to the below listed sequence of input.
- Up to 10 program steps can be stored per program. In case there are more program steps required ask for the optional PC-Software h/p/cosmos para graphics[®] which is able to control all functions of the ladder ergometer via host PC and also to serve for on-line monitoring of all data.
- During programming the displays indicate the values of the present program step and not the value of the total distance or total time programmed so far for this profile.
- In case of entering a false value, or in case you want to alternate a profile, you can "scroll" the profile steps with the help of the keys 👗 and 🜉. With the help of the keys 🗼 and 🕌 you can alternate the values..
- During programming procedure the display indicates the acceleration level " Acc X " for the single program step.
- During the short sprint (see below listed program step no. 4) the machine speeds up at acceleration level 4 and reduces the speed at level 2 after the sprint distance of 200 meters.
- During programming procedure the display indicates the present program step " St X "

The profile

Sequence	Step	Level Beschleunigung	Speed		
Warming up	1	1	5,0 m/min		5:00 min.
Speed increase	2	1	8,0 m/min		2:30 min.
Easy sprint	3	2	10,0 m/min		4:00 min.
Sprint with fast	4	4	16,0 m/min	200 m	
acceleration					
Cool-down	5	2	6,0 m/min		5:00 min.
Stop	6	1	0,0 m/min		0:00 min.
Programming example for program Pr. 21

Start: ladder ergometer is in standby mode. LED mode is flashing.

Select mode Test



until Test LED is flashing

Confirm mode



Display Pr. 1" is flashing for Program no. 1

Select program-no.



until Display "Pr. 21 " is flashing

Display Pr. 21" is flashing

Confirm program-no.



for at least 5 seconds

- Display is flashing: value "0.0" Display indicates " St.1 " (Profile I. Step 1)

Select speed 5.0 m/min



Confirm speed



Display is flashing: "0"

Confirm Distance 0

(this step will be programmed after time)



Display indicates the time (Minutes): value "0:00" is flashing

Select time 5 min.



Confirm time



Display indicates the time (Seconds): value "0:00" is flashing

Confirm time 00 sec.



Display $\fbox{\sc box{\sc box\s\sc box{\sc box\sc box\sc box\sc box\sc box{\sc box\sc b$ Level: value "Acc. 1" is flashing.

Confirm acceleration level 1



- Display indicates the speed: value L "0.0" is flashing
- Display indicates the Program Step:" St. 2 "

Select speed 8.0 m/min



Confirm speed



Display is flashing: "0"

Confirm Distance 0

(this step will be programmed after time)



Display indicates the Time (Minutes): value "0:00" is flashing

Select time 2 min.



Confirm time



Display indicates the Time (Seconds): value "0:00" is flashing

Select time 30 sec.



Confirm time



Display <u>____</u> indicates the Acceleration Level: value "Acc. 1" is flashing.

Confirm Acceleration Level 1



- Display indicates the Speed: value "0.0" is flashing
- Display indicates the Program Step:" St. 3 "

Select speed 10.0 m/min



Confirm speed



Display is flashing: "0"

Confirm Distance 0

(this step will be programmed after time)



Display <u>zeigt</u> zeigt die Zeit (Minuten): Wert "0:00" blinkt

Select time 4 min.



Confirm time



Display indicates the Time (Seconds): value "0:00" is flashing

Confirm time 00 sec.



Display <u>best</u> indicates the Acceleration Level: value "Acc. 1" is flashing.

Select acceleration level 2



Confirm acceleration level 2



- Display indicates the Speed: value "0.0" is flashing
- Display indicates the Program Step:" St. 4 "

Select speed 16.0 m/min



Confirm speed



■ Display z is flashing: "0"

Select distance 200 meter

(this step will be programmed after distance)

- + ↓ or ▶

Confirm distance



Display indicates the Acceleration Level: value "Acc. 1" is flashing

Select acceleration level 4



Confirm acceleration level



- Display indicates the Speed: value
 "0.0" is flashing.
 Display indicates the Descram
- Display Transformer indicates the Program Step:" St. 5 "

Select speed 6.0 m/min



Confirm speed



Display bistance is flashing: "0

Confirm Distance 0

(this step will be programmed after time)



Display indicates the Time (Minutes): value "0:00" is flashing

Select time 5 min.



Confirm time



Display indicates the Time (Seconds): value "0:00" is flashing

Confirm time 00 sec.



Display indicates the Acceleration Level: value "Acc. 1" is flashing

Select Acceleration Level 2

In this program step the speed will be reduced from 16 m/min to 6 m/min at an acceleration level "2"



Confirm acceleration level



- Display indicates the Speed: value "0.0" is flashing
- Display indicates the Program Step:" St. 6

Confirm stop-speed "0 km/h" and save the programmed profile



for more than 5 seconds

End of Programming.

The Profile can be started later on in Test Mode Pr. 21

For a better documentation we recommend to use a printer linked to the serial interface RS 232 or/and to use an external PC with the Software h/p/cosmos para graphics.

Possibilities of interfering in Test Mode manually

Alteration of speed

(only valid for the actual program step, no alteration in the memory)



Speed is being increased / reduced (0-max.).If SPEED is being reduced down to "0" = PAUSE-position

Display indicates: PAUS

Alteration of acceleration level.

(only during increase or decrease of speed)



e.g. 2x acceleration level: 2 (limited by the max. acceleration level selected in the Optional Mode: standard value=4). During Deceleration this function alternates the degree of Deceleration.

Switch over to the next program step or one program step back

(not activated in every test).



Jump over to the next program step or jump to the previous program step

Switch over to the next mode or one mode back

(not activated in every test)



Jump over to the next Mode or jump to the previous Mode.

This is a perfect way to change from Test Mode to Manual Mode (cool down) without stop of the belt.

For a better documentation we recommend to use a printer linked to the serial interface RS 232 or/and to use an external PC with the Software h/p/cosmos para graphics.

Optional Settings

Optional settings serve for example as an acknowledgement of error notes on the display, or for the standard setting of the device: selection of RS232 interface protocol, etc.

Remark for devices without UserTerminal: For optional settings on devices without UserTerminal an external UserTerminal or a connected PC with the software h/p/cosmos para control is required.

Starting position: One of the modes of operation is flashing: (Manual, Profile, Cardio, Test)

A Select options

Select of the mode for user options (OP xx) There are also some extra options available in the "operator", but this mode is only for authorized service engineers.



and then in addition

and then in addition

keep all three buttons pressed for at least 3 seconds

- Display indicates flashing: OP 01 (for option no. 01)
- Display and indicate: E.rE SEt (for Error reset)

Select the option no.



- Display indicates flashing: OP 01 ... OP 99
- Display and indicate a short explanation of the option, e.g.: E.rE SEt (for Error reset)

Confirm the option no.



Read, confirm and adjust the options and parameters according to the following List of options.

All changeable values are indicated flashing.

All values not changeable are indicated not flashing.

Examples:

OP 01 (OIL & other error codes): Confirmation & Deleting with



Display indicate: donE

OP 02 (Distance / km): Confirmation with



OP 08 (STOP-time):

```
a) Changing the values with
```



b) Confirmation of this value with

B List of options / Optional functions

For devices without UserTerminal: An external UserTerminal or a PC-software h/p/cosmos para control is required for this.

OP 01

Set back (delete) of error messages

The required maintenance work has to be performed before deleting error messages. The service department has to be contacted before one of the service displays or error codes will be deleted!

Confirmation in the display indicating "donE" I.

> Info: This option only sets back the error message! If the error still exists, you are not able to set back the error message. In this case consult an authorized service engineer

OP 02

Indication of: total distance covered

- Display indicates: Total distance in km I
- I LED km is flashing

I OP 03

Indication of: Total hours of operation (h)

= stand-by-time including runtime of motor/running_machine

- Display indicate: Total hours Display I
- l

I OP 04

Indication of: Total hours of operation (h) = runtime of motor/running machine

- Display indicate: Total hours
- l

I OP 05

Indication of: EPROM Firmware-Version

- Display indicate: MCU 4 Display indicate: e.g. 3.01.2 l

OP 06

Adjustment of actual date and the real time clock

- Display indicate: rtc for Real Time Clock Display indicates flashing: Date /Time (year, month, day, hours, minutes, seconds) l

Acoustic Heart-Rate-signal

This function is normally used to control the regularity of the heart rate or to find reasons for transmitting problems (like mobile phones or computer monitors).

 $\mathsf{Display}\left[\begin{smallmatrix} \mathsf{MEATTRATE}\\ $$$$$$$$$$$$$$$$$$$ indicate: OFF or ON $$$ OFF: No acoustic heart-rate-signal ON: Acoustic heart-rate-signal for every beat

OP 08

Stopping Time / Deceleration Time after STOP key in relation to the max. speed

- Display indicate: Stoptime in sec.
- I. Adjustable from 5 ... 30 seconds

OP 09

Starting Speed (Modus Manual and Cardio) for feedback after START key can be reduced to 0.0 m/min for advanced users

- Display indicate: Start speed in m/min
- I LED m/min is glowing
- I Adjustable from 0.0 m/min ... 5.0 m/min

OP 11

Scaling of Profile mode (not for Test mode)

Display indicate: Degree of scaling

0: no scaling (default)

1: the scale 1 ... 6, which is shown in the Profile mode is valid for all parameters (Speed, Elevation, Time)

2: the scale 1 ... 6 can be set individual for every single parameter (Speed, Elevation, Time)

OP 12

Unit for display of speed

- Display indicate: Unit for speed 3: m/min
 - LED m/min is glowing

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Display of unit for distance

Display indicate: Unit for distance

2: m

LED m is glowing

OP 14

Display of unit for angle of elevation

- Display indicate: Unit for elevation 1: °
- LED ° is glowing

OP 15

Subject's Body Weight (default value)

- Display indicate: 10 ... 150 (estimated weight)
- LED kg is golwing The personal body weight is necessary for a more correct calculation (estimation) of the power and energy consumption.

OP 16

Request for body weight before manual or automatic start

0 = Request for body weight before starting a program is not required. Calculation of energy consumption and power is based on the body weight entered in option no 15.

1 = Input of body weight before starting a program is required. Calculation of energy consumption and power is based on the entered body weight.

OP 17

Unit for energy consumption

0 = kJoule is the unit for energy consumption

1 = kcal is the unit for energy consumption

I

RS 232 interface protocol: COM 1

- Display indicates flashing: Number of the RS232 interface protocol
 - Display and heart rate indicate:
 - 0 = RS 232 not active / no protocol
 - 1 = coscom by h/p/cosmos (= standard setting COM 1 und COM 2)
 - 3 = Printer protocol
 - 10 = Loop Back Test (special test plug required)
 - 11 = SunTech Tango blood pressure meter
 - 12 = Remote Terminal MCU 4

Individual adaptation of protocol on request. For further information about the h/p/cosmos coscom protocol see www.coscom.org

OP 21

RS232 interface protocol: COM 2

- 0 = RS 232 not active / no protocol
- 1 = coscom by h/p/cosmos (= standard setting COM 1 und COM 2)
- 3 = Printer protocol
- 10 = Loop Back Test (special test plug required)
- 11 = SunTech Tango blood pressure meter
- 12 = Remote Terminal MCU 4

Individual adaptation of protocol on request. For further information about the h/p/cosmos coscom protocol see www.coscom.org

OP 27

Minimum acceleration and deceleration level

The selected minimum level is valid for all acceleration and deceleration processes in all modes and profiles.

- Display indicates 1 ... 4 (Standard: 1) for the minimum acceleration and deceleration level for all modes and profiles.
- Due to safety reasons, the acceleration / deceleration levels 5, 6 and 7 can not be selected.

Note:

The selected acceleration and deceleration level is NOT valid for control and operation via RS232-interface. In this case the acceleration and deceleration level is set in option number 29.

Maximum acceleration and deceleration level

The selected maximum level is valid for all acceleration and deceleration processes in all modes and profiles.

Display indicates 1 ... 7 (Standard: 4) for the maximum acceleration and deceleration level for all modes and profiles.

Notes:

Due to safety reasons the maximum acceleration and deceleration levels 5, 6 and 7 must only be unlocked if the safety of the training person is guaranteed.

The selected acceleration and deceleration level is NOT valid for control and operation via RS232-interface. In this case the acceleration and deceleration level is set in option number 29

OP 29

Acceleration and deceleration level for RS 232 interface

The selected acceleration and deceleration level is valid for control and operation via RS232 interface. This option is very helpful, if the peripheral equipment (e.g. ECG, Ergospirometry, PC) does not offer a menu for acceleration and deceleration levels.

Display indicates 1 ... 5 (Standard: 1) for the acceleration and deceleration level for all speed commands via RS 232.

Note:

If the peripheral equipment sends an acceleration and deceleration command via the h/p/cosmos coscom-protocol, the selected level in option number 29 is not valid for these speed commands.

OP 40

Locking the ladder-ergometer

0 = After switching on, the treadmill is completely locked / not accessible. To unlock the ladderergometer, press the buttons +, - and START together at the same time. While locked the display shows "no ACCESS"

1 = ladder-ergometer is unlocked / accessible (standard)

OP 41

Locking and unlocking the manual mode

0 = manual mode is locked / not accessible

1 = manual mode is unlocked / accessible (standard)

Locking and unlocking the profile mode

0 = profile mode is locked / not accessible 1-99 = profile mode is unlocked / accessible up to the selected profile number Standard: 6

Example:

selected profile number = 3: The profiles 1-3 can be selected, the profiles 4 - 99 can not be selected.

OP 43

Locking and unlocking the cardio mode

0 = cardio mode is locked / not accessible 1 = cardio mode is unlocked (standard)

OP 44

Locking and unlocking the test mode

0 = test mode is locked / not accessible 1-99 = test mode is unlocked / accessible up to the selected test profile number Standard: 24

Example:

selected test number = 5: The test profiles 1-5 can be selected, the test profiles 6 - 99 can not be selected

OP 52

Output interval for printer protocol

By entering a value between 0 and 99 the output interval is set in seconds for a printer directly connected to the treadmill. Standard: 60 (= Printout of all values once a minute)

OP 53

Language for printer protocol

Select the language for printouts on a printer directly connected to the treadmill. You can choose between six languages.

1 = EnGI = english (standard)	4 = Span = spanish
2 = Germ = german	5 = Port = portuguese
3 = Fren = french	6 = Hung = hungarian

As the printout is limited to ASCII, printing of special characters and symbols is not possible.

B1 Standard Adjustments for the user options

OP no.	Character / Function of option	Default setting	Adjustable range
OP 01	Set back of error messages		
OP 02	Total distance (km)	Only information:	0 4.000.000 km
OP 03	Total hours of operation stand-by incl. runtime (h)	Only information:	0 1.000.000 h
OP 04	Total hours of operation runtime only (h)	Only information:	0 1.000.000 h
OP 05	EPROM Firmware-Version	Only information:	X.XX.X
OP 06	Adjustment of the real time clock	actual date/time	aktuell 31.12.2094
OP 07	Acoustic Heart-Rate-signal	OFF	OFF or ON
OP 08	Stopping / Deceleration Time	5 seconds	5 30 seconds
OP 09	Starting Speed (Modus Manual and Cardio)	0.5 m/min	0,0 m/min 5,0 m/min
OP 11	Scaling of Profile mode	0	0, 1 or 2
OP 12	Unit for display of speed	3: m/min	3: m/min
OP 13	Unit for display of distance	2: m	2: m
OP 14	Unit for angle of elevation	0: % (Percent)	0: % 1: °
OP 15	Subject's Body Weight	65 kg	10 150 kg
OP 16	Request for body weight before manual or automatic start	0 (off)	0 = off 1 = on
OP 17	Unit for energy consumption	0 = kJoule	0 = kJoule 1 = kcal
OP 20	RS 232 interface protocol: COM 1	1: coscom by h/p/cosmos	1 12
OP 21	RS 232 interface protocol: COM 2	1: coscom by h/p/cosmos	1 12

OP no.	Character / Function of option	Default setting	Adjustable range
OP 27	Minimum acceleration and deceleration level	1	1 4
OP 28	Maximum acceleration and deceleration level	4	1 7
OP 29	Acceleration and deceleration level for remote control via RS232 interface	1	1 5
OP 40	Locking and unlocking the treadmill	1 (unlocked)	0 = locked 1 = unlocked
OP 41	Locking and unlocking the Manual mode	1 (unlocked)	0 = locked 1 = unlocked
OP 42	Locking and unlocking the Profile mode	6 (unlocked up to profile number 6)	0 99
OP 43	Locking and unlocking the Cardio mode	1 (unlocked)	0 = locked 1 = unlocked
OP 44	Locking and unlocking the Test mode	24 (unlocked up to test number 24)	0 99
OP 52	Output interval for printer protocol	60 (seconds)	1 100
OP 53	Language for printer protocol	1 (english)	1 = english 2 = german 3 = french 4 = spanish 5 = portuguese 6 = hungarian

Maintenance

For safety reasons switch off and unplug the ladder ergometer before any intervention in the device.

Some ladder ergometers do not have a user terminal and for that reason neither a keyboard nor a display. They only can be remote-controlled with the RS232 interface, e.g. with an ECG, an ergospirometry, PC with software h/p/cosmos para graphics or h/p/cosmos para control. An enumeration of the compatible peripherals you can find in the compatibility list of the operating instructions.

For maintenance or diagnosis purposes we also suggest the PC software h/p/cosmos para control (Freeware).

Optional there is also an external user terminal available for these models, which has to be connected with the treadmill via the RS232 interface.

A Preventive maintenance

The service technicians and engineers will advise you and remedy things, if there is a disorder.

A preventive maintenance often can prevent problems in the run-up to and for the future, as well as guarantee an optimum condition of the device. For that reason ask for the annual preventive maintenance at the service center.

Always check, if the cable, the plug, the power point and the power supply entry of the device is faultless before switching on the device.

B Immediate maintenance

You have to do immediate maintenance, if

- the device is extremely strained in a mechanical way (bump, cable defect, etc.)
- fluid got into the device
- cable and/or plugs are damaged
- the cover fall of
- chain, guide bars or single bars show extreme signs of wear

Only an orderly and regular maintained device is save. The maintenance of the device can also be done in the framework of a maintenance contract from the authorized customer service.

C Prescribed returned controls

For the use as sports or medical device.

You have to carry out regular checks and safety requirement inspections to maintain the orderly condition of the electrical devices (e.g. in Germany based on BGV A2, regulations for prevention of accidents as well as safety requirement inspections in accordance with Medical Device Directive).

For treadmill and ladder ergometers a deadline of on year is stipulated. Only an authorized electrical expert is allowed to do the check.

The following checks have to be done

C1 Visual check

- The connecting lead (power supply) of the device has to be checked for outside defects and the tension relief for its placement
- The cooler openings of the engine and the frequency converter have to be clean
- The protection covers of the ladder ergometer, like the plastic-cover of the installation channel in the surrounding of the engine, have to be undamaged
- Damaged and illegible caution symbols have to be exchanged
- All earth-wire connections have to be checked for damages and their correct fitting.

C2 Earth-wire resistance measurement

- The low-impedance walk-trough has to be tested with the earth-wire resistance measurement with an appropriate measuring instrument in accordance with VDE 0701/0702 (sport device) VDE 0751 (medical device).
- Move the connecting lead at least 5 seconds while measuring. If the resistance changes while doing so, the cable might be damaged.
- Check the power supply lead separate, because the ladder ergometer has a removable cable.

C3 Isolation-resistor measurement

- Make sure that all isolations, which are strained with mains voltage are checked. All switches and electrical relays have to be closed.
- The measurement has to be done with a measuring instrument for the measurement of isolation-resistors in accordance with VDE 0701/0702 (sports device) VDE 0751 (medical device).

C4 Alternative leakage current measurement

The measurement has to be done with a measuring instrument for the measurement of leakage current in accordance with VDE 0701/0702/0751.

A respective test protocol you get from the manufacturer at request.

D Regular maintenance

The display of the ladder ergometer will ask you for the following maintenance works in regularly intervals (every 100 km). In the display "speed" appears the message "E01" in all other displays the message "OIL".

If you have a ladder ergometer without user terminal (control panel with display and keyboard) an acoustical signal gives notice (peep-tone series) after switching on the main-switch: 5 x long (code for "0") and afterwards 1 x short + 4 x long (code for "1"). This code means as well: "E 01" (error 01).

The device does not have a sensor and the oil-warning does not end automatically after greasing the chain! The oil-warning has to be quit with "option 01" after greasing the chain and carrying out all other maintenance works.

- For safety reasons always switch off and unplug the ladder ergometer before any intervention in the device.
- Take care that you do not come in any contact with the chain or any other movable parts.

D1 Greasing the ball-bearing

You reach the ball-bearing when removing both backplates of the ladder ergometer. Grease the ball-bearings with a standard grease-squeezer (obtainable at h/p/cosmos at request). In special cases grease the bearings in between of maintenance intervals, if dry abrasion noise appears.

D2 Greasing the chain and the guide-bar

It is necessary to grease the chain and the guide-bar, if it is not possible to move the ladder ergometer joltfree with working brake motor and a dead-weight of 20 kg.

You find the guide-bars at the outer endings of the bars directly behind the protection cover. Grease the chain and the guide-bar with standard chain-spray (obtainable at h/p/cosmos at request).

At the latest also grease the parts in between, when dry abrasion noise appears during the training.

D3 Cleaning the interior

Remove the backplate of the ladder ergometer to clean the interior. The cleaning can be done with a vacuum cleaner.

Do not use water to clean. Take special care to remove the dust from the fan of the engine.

D4 Setting and cleaning of the photoelectric barrier

A safety photoelectric barrier is installed at the bottom end of the ladder to secure the place of draft. It switches off the motor brake when interfered. As a security system the photoelectric barrier releases a "Quick-Stop-Function", when the ray of light is interrupted by foot, by hand, because of a fallen towel, an overall or because of dust of the optics or the reflectors of the photoelectric barrier.

The photoelectric barriers and the reflectors have to be cleaned carefully with a damp towel weekly, according to the pollution and the dust in the surrounding room-air. Otherwise it might come to an unintended switch off.

The setting (direction and focal point/sharpness) can be controlled and adjusted in a dark room only.

If problems with unintended switch offs occur and the cleaning does not bring any success, control and adjust the setting (direction and focal point/sharpness) in a dark room. For that purpose a special small screwdriver is necessary.

Troubleshooting

A Mechanical / Noise problems

In case you hear noises like knocking or rattling during the training please check if the machine has a firm stand and follow exactly the advises in the chapter "Mechanical Installation" in this manual.

B Fuses

The ladder ergometers are equipped with an expulsion fuse at the left side of the device.

Inside the machine you can find the power supply for the electronic control unit, inside the housing of the power supply are one (sport and fitness machines) / two (medical devices) secondary fuses. Furthermore inside products for medical use you will find the secondary fuse of the isolation transformer here.

C Interference Factor

C1 Electrostatic Discharge

If the user moves around the devices they can be electro statically charged with up to several thousand volts. If then the user touches a metal piece, keys or display, it can lead to an electrostatic discharge between the user and the device.

Electrostatic discharges can in certain cases result in an interference of the device. Generally those electrostatic discharges are without harm for the user as well as for the device, but can be quite unpleasant. The main causes for electrostatic discharges are the choice of clothes, the sole of a shoe and the movement. Very dry air and many light fittings can also lead to the same results.

Solution: Try different clothes or shoes, humidify the air in the room, and switch part of the light fittings off. Please inform the manufacturer if you detect such interference.

C2 Source of Interference

The devices should not be installed near to e.g. an x-ray device, motors or transformer with high connection power, as the electric and magnetic interference can falsify measurements. Very strong sources of interference (e.g. above the limit according to EMT) can influence the functions of the device. High-tension power lines nearby and electrical devices without $\mathbf{C} \mathbf{\epsilon}$ -sign and without a certificate of compliance for electro-magnetic-tolerance should be avoided as well.

D Malfunctions of the heart rate measurement system POLAR

Possible sources of interference

- Screens, computer, printer
- Electric devices, electric motors, transformer
- High-voltage transmission lines, also from trains
- Strong fluorescent tubes near by
- Central heating radiators
- Other electric devices

In order to prevent the ladder ergometer being interfered by such factors, place the device at some distance away from such interference sources. Do not rely on the indicated values if you suspect interference.

Please also pay attention to the instruction of the manufacturer POLAR concerning interference.

D1 Troubleshooting heart rate measurement system POLAR

see: list of options: OP 07

OP 07

Activate: Acoustic Heart-Rate-signal

■ Display ^{mean} indicate: OFF or ON

OFF: No acoustic heart-rate-signal

ON: Acoustic heart-rate-signal for every beat. This function is normally used to control the regularity of the heart rate or to find reasons for transmitting problems (like mobile phones or computer monitors).

E Malfunctions of the RS232 interface

The most common causes for problem with the RS232 interface are

- Wrong connection cable between the ladder ergometer and the periphery
- Technical defects of the connection cable or male / female connector
- False setting of protocols / driver at ladder ergometer or periphery (ECG, PC, Ergospirometry)
- False setting of COM port at periphery (ECG, PC, Ergospirometry)

E1 Troubleshooting and testing of the RS232 interface

- Loop-Back Test: For testing the RS232 of the ladder ergometer a special RS232 test plug including testing instruction is available from the manufacturer. Connect the plug to the RS232 port and adjust Option 20: 10
- A blinking code and the instruction will tell you if input and output of the RS 232 are working well.
- PC software h/p/cosmos para control (Freeware): If you install the software to an external PC you can control the ladder ergometer. If it works you know the ladder ergometer, the RS232 interface connection cable and the RS 232 interface card of the PC are working well.

F Malfunctions of the control unit

In rare cases after several years of use malfunctions of the control unit because of decreasment of the battery power are possible.

In this case contact the service department to change the battery of the control unit.

G Error messages / Error codes

Many times malfunctions and error messages are caused by problems with the voltage power supply or lack of service.

- Check voltage supply. Do not use extension cords or multi-way connectors! Connect the machine direct to the socket in the wall. Each machine should have an individual circuit.
- Check mechanical parts for any malfunction. Check also for towels or other things, which might interfere the drive system.
- Check if any light barrier are dusty or not correctly adjusted.
- Check lubrication of the chains and lubricate if required.
- Also contact problems at connectors (loose connections) caused by vibrations can result in malfunctions. So please check cables and connectors for loose connections.

The device has a self-diagnosis which recognizes some errors and shows their error messages on the display of the MCU UserTerminal (operating terminal) or the frequency changer / inverter (inside the device).

G1 Devices without UserTerminal

The devices without UserTerminal are equipped with an automatic error message codes via acoustic signal (bleep) indicating the device has a malfunction or needs to be lubricated or regular service.

Example OIL Message:

On standard setting every 100 km after switching on the device (main power switch) the acoustic signal "5 times LONG (code for "0")" and 1 time SHORT + 4 times LONG (code for "1") will be repeated 3 times. Error Code list see: Devices with UserTerminal. The error messages have to be terminated with "OPTION 01". An external UserTerminal or a PCsoftware h/p/cosmos para control is required for this.

G2 Devices with UserTerminal

I E 01

maintainance due



Ladder ergometer is still functioning

- Every 1000 km (interval is adjustable) lubrication service is due. See chapter "lubrication of the running belt". Lubricate running belt.
- Attention! Running-Machine has no sensor for OIL. Lubrication only according to operation manual. Error Message does not disappear automatically.
- Set back Error Message (Option OP01)

E 02

Service interval due



Running-Machine is still functioning

- Every 500 km (interval is adjustable) a general service (interior cleansing, checking the driving belt, running belt, etc.) is due.
- I. Erase the message with "OPTION 01" and contact authorized service engineer for service.

E 10

Stop key (Reha-Stop) was pressed more than 5 seconds.

Set back with Option 01 (if error message does not disappear, contact authorized service engineer for service)

E 30

Error of speed / distance measurement



Ladder ergometer can still operate at speed of max. approx. 1km/h

- Drive motor or chain system is "blocked" or too slow due to undervoltage, caused by a thin power supply cord (cable).
- Drive motor or chain system is "blocked" or too slow due to mechanical overload.
- Speed sensor is dirty/dusty or not adjusted properly: Due to lack of signals from the speed sensor (slot-disk with light barrier) the MCU control board indicates "E30"
- Speed-Calibration (OPTION 34) is wrong.
- Safety delay time (inverter or MCU) is longer than the high acceleration command (SPRINT function or high acceleration level)
- Maybe technical blocking of chains (e.g. alien element, towel trapped in device)
- Maybe power supply too weak because of an extension cable, etc.
- Check Power Supply and Power Cord.
- Maybe Speed-Sensor adjustment is wrong or the sensor may be dirty or defective.
- See instruction according administrator OPTION 480rder service mechanic.
- Check voltage supply. Do not use extension cords! Connect the machine direct to the socket in the wall.
- Check mechanical parts for any malfunction. Maybe several persons were standing on the machine for a moment?
- Check also for towels or other things, which might interfere the drive system.
- Remove bellow from upper frame.
- Attention! Dangerous voltage and danger of being hurt when the device is open. Do not touch the parts inside the device!
- Clean the speed sensor (light barrier and disk) and check the adjustment of the sensor according to the instruction.
- Check if the Safety delay time (inverter or MCU) is longer than the high acceleration command (SPRINT function or high acceleration level)
- Erase the message with "OPTION 01". In case the message appears again, contact authorized service engineer.

E 50

Error of frequency inverter / motor regulation



BTANCE ELEVATION HEART RATE ,HELP" is flashing.

Ladder ergometer is not functioning

- Maybe defective Inverter Drive.
- Maybe power supply too weak because of an extension cable etc.
- Check Power Supply and Power Cord.
- Order service mechanic

E 81

HELP - Emergency-Switch has been activated Possible source: Stop-button ("Sliding-Handle") at the right.

- Check the source for Emergency-Switch-Off.
- In case of doubts contact authorized service engineer.
- Erase the message with "OPTION 01".
- If machine is not functioning, contact authorized service engineer.

E 82

HELP - Emergency-Switch has been activated Possible source: Stop-button ("Sliding-Handle") at the left.

- Check the source for Emergency-Switch-Off.
- In case of doubts contact authorized service engineer.
- Erase the message with "OPTION 01".
- If machine is not functioning, contact authorized service engineer

E 83

HELP - Emergency-Switch has been activated Source: External Emergency Quick-Stop.

- Check the source for Emergency-Switch-Off.
- In case of doubts contact authorized service engineer.
- Erase the message with "OPTION 01".
- If machine is not functioning, contact authorized service engineer

E 84

HELP - Emergency-Switch has been activated Source: Light-Barrier at front re-entry-zone.

- Check the source for Emergency-Switch-Off.
- In case of doubts contact authorized service engineer.
- Erase the message with "OPTION 01".
- If machine is not functioning, contact authorized service engineer

E 85

HELP - Emergency-Switch has been activated Source: Light-Barrier at rear re-entry-zone.

- Check the source for Emergency-Switch-Off.
- In case of doubts contact authorized service engineer.
- Erase the message with "OPTION 01".
- If machine is not functioning, contact authorized service engineer

G3 Set back of error message

Devices without UserTerminal

Error messages have to be erased with OPTION 01. An external UserTerminal or a PC-software h/p/cosmos para control is required for this.

Devices with UserTerminal

Start: ladder-ergometer is not moving. One of the modes of operation is flashing: (Manual, Profile, Cardio, Test)

Select of the mode for user options (OP xx)

Delete the oil message



keep all three buttons pressed for at least 3 seconds

- Display indicate: OP 01 is flashing (for option no. 01)
- Display and indicate: E.rE SEt (Error reset)

- Display indicate: OP 01 is flashing (for option no. 01)
 Display and indicate: E.rE
 - SEt (Error reset)

End options mode



Stand-By Mode LED Manual, Profile, Cardio or Test is flashing

Confirm the option no.1



Display indicate: done to inform you that you have to delete the oil message

In case the error message cannot be erased, maybe the source of interference is still not eliminated. Maybe it is an error message, which cannot be erased by the user, but by the administrator only. Call an authorized service engineer.

H Cleaning up

For any questions about cleaning up the ladder ergometer, please contact the manufacturer.

Technical Data

A Data spread sheet

Ladder ergometer:	h/p/cos	mos discovery 4.0		
	h/p/cosmos discovery It 4.0			
	standard	d version for sports & fitness purpose		
Useable (Productive) height	of climb:	235 cm max.		
Rung interval:		25.4 cm (10.0 inches)		
Rung width:		49.5 cm (19.5 inches)		
Angle of gradient:		75°		
Speed range:		1,0 - 40.0 meter/min. resolution 0.1 m/min		
Acceleration:		7 levels (3 131 sec. from 0 to max.)		
Deceleration:		7 levels (3 131 sec. from 0 to max.)		
Brake system:		3 phase AC motor (CE-mark, no maintenance)		
Motor capacity:		0.75 kW		
Power transmission:		chain system		
Safety measurements:		CE, IEC EN 60335-1 (VDE 0700) IEC EN 60601-1-2		
		IEC EN 60601-1-4, VDE 0701, EN 957-1, EN 957-2		
		light barriers, automatic-stop,		
		handrails on both sides and at the top		
Heart rate measurement:		POLAR wireless, 1-channel-receiver,		
		ECG-accurate measurement beat-to-beat		
Physical load control:		automatic control of speed according to target heart rate		
Display:		(not for h/p/cosmos discovery It 4.0)		
		6 LCD Displays for Speed, Distance, Time,		
		Gradient, Program-No. & Step, Energy Consumption,		
		Wattage, Heart Rate (Pulse)		
interface:		digital: RS 232 (V 24) incl. PC-, CosCom-,		
		and series interface protocol		
programs:		10 facilities total incl. test-programs,		
		4 facilities free programmable with up to 10 steps		
software:		(option, extra charge) h/p/cosmos para graphics		
colour of frame:		Grey-Aluminium RAL 9007 (powder-coated)		
voltage supply:		220/240 Volt, 50/60 cycles (Hz), 1 phase AC, 16A		
		(special voltage supply available on request)		
size of frame:		Width: 90cm (35.43 inch) Depth: 101cm (39.76 inch)		
		Height: 247cm (97.23 inch)		
weight:		approx. 300 kg (660 pounds)		
shipping size:		Length: 263cm (103.54 inch)		
		Width: 106cm (41.73 inch)		
		Height: 115cm (45.27 inch)		
shipping weight:		approx. 370 kg (810 pounds)		
Please ask for further details	and option	al equipment.		
Subject to technical alteration	ns without p	rior notice.		
Errors and omissions accept	ed.			

Ladder ergometer:

h/p/cosmos discovery med 4.0 h/p/cosmos discovery It med 4.0

standard version for sports & fitness purpose

Useable (Productive) height of climb:	235 cm max.
Rung interval:	25.4 cm (10.0 inches)
Rung width:	49.5 cm (19.5 inches)
Angle of gradient:	75°
Speed range:	1,0 - 40.0 meter/min. resolution 0.1 m/min
Acceleration:	7 levels (3 131 sec. from 0 to max.)
Deceleration:	7 levels (3 131 sec. from 0 to max.)
Brake system:	3 phase AC motor (CE-mark, no maintenance)
Motor capacity:	0.75 kW
Power transmission:	chain system
Safety measurements:	CE0123, MPG, RL 93/42 EWG, IEC EN 60335-1 (VDE 0700)
	IEC EN 60601-1 (VDE 0750), IEC EN 60601-1-2,
	IEC EN 60601-1-4, VDE 0701, VDE 0751,
	EN 957-1, EN 957-2
	light barriers, automatic-stop,
	handrails on both sides and at the top
Heart rate measurement:	POLAR wireless, 1-channel-receiver,
	ECG-accurate measurement beat-to-beat
Physical load control:	automatic control of speed according to target heart rate
Display:	(not for h/p/cosmos discovery It 4.0)
	6 LCD Displays for Speed, Distance, Time,
	Gradient, Program-No. & Step, Energy Consumption,
	Wattage, Heart Rate (Pulse)
interface:	digital: RS 232 (V 24) incl. PC-, CosCom-,
	and series interface protocol
programs:	10 facilities total incl. test-programs,
	4 facilities free programmable with up to 10 steps
software:	(option, extra charge) h/p/cosmos para graphics
colour of frame:	Grey-Aluminium RAL 9007 (powder-coated)
voltage supply:	220/240 Volt, 50/60 cycles (Hz), 1 phase AC, 16A
	(special voltage supply available on request)
size of frame:	Width: 90cm (35.43 inch) Depth: 101cm (39.76 inch)
	Height: 247cm (97.23 inch)
weight:	approx. 300 kg (660 pounds)
shipping size:	Length: 263cm (103.54 inch)
	Width: 106cm (41.73 inch)
	Height: 115cm (45.27 inch)
shipping weight:	approx. 370 kg (810 pounds)

Please ask for further details and optional equipment. Subject to technical alterations without prior notice. Errors and omissions accepted.

B Compatibility RS232 interface

System	Manufacture	Туре	RS 232 Protocol	Treadmill-Setup
Blood Pressure	SunTech Medical	Tango	h/p/cosmos coscom®	see option 20 or 21
PC Software	h/p/cosmos	h/p/cosmos para graphics	h/p/cosmos coscom®	see option 20 or 21
PC Software	h/p/cosmos	h/p/cosmos para control (virtual user terminal)	h/p/cosmos coscom®	see option 20 or 21
Test-Plug in for RS232 Port	h/p/cosmos	LED + switch	h/p/cosmos Loop-Back	see option 20 or 21

You can get the protocol h/p/cosmos coscom[®] for the RS232 interface at www.coscom.org. E & OE. Subject to alterations without prior notice.

Notes:

- Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC standards (e.g. IEC 950 for data processing equipment and IEC 601-1 for medical equipment.
- Furthermore all configurations shall comply with the valid version of the system standard IEC 601-1-1.
- Everybody who connects additional equipment to the signal input pert or signal output part configures a medical system, and is therefore responsible that the system complies with the requirements of the valid version of the system standard IEC 601-1-1. (MDD: 13.6.c, IEC 601-1: 6.8.2.c, 19.2.b, 19.2.c)

Accessories and options

A Digital (serial) RS232 interface

- Connecting a ladder ergometer to a medical device results in a medical system. Only authorized trained staff is entitled to perform this connection.
- This medical system, when connecting a ladder ergometer to a medical device, has to be connected via a potential-balance-cable with the provided connector bolt and with the provided bearing within the medically used room.

The interface serves as a data transmitter from the ladder ergometer to a PC or other controlling devices. You can also control the ladder ergometer from another controlling device (ECG. o.a.) or with the appropriate Software from a PC, via interface. Standard for all devices is ONE serial interface COM 1.

Optionally there is a SECOND serial interface COM 2 (Order no. 000 9801 0025) and also an analogue interface available.

For further information please contact your dealer. The RS232 interface protocol h/p/cosmos coscom[®] is available on request or can be found at www.coscom.org

The incorporated protocols (e.g. for ECG-devices) are listed in the list of options under OPTION 20 / OPTION 21

A1 Interface cable RS232 for connection to PC

To be used for h/p/cosmos para graphics, h/p/cosmos para control, PC, ECGs, Ergospirometry devices.

For connecting your PC to the ladder ergometer you need an interface cable (optional equipment) 9-pole Sub- D (male - female) with crossed transmission- receive- cable (PIN 2 and PIN 3).



PC COM1 oder COM2 CONNECTOR DB9 Buchse / female Laufband / treadmill CONNECTOR DB9 Stecker / male

RS 232 interface cable for PC Order-no.: 000 9701 0034 for 5 m length Order-no.. 000 9701 0035 for 10 m length

A2 Interface cable RS232 for connection to ergospirometry JAEGER OXYCON

OXYCON Alpha / Delta / Champion / Pro: Connect the Running-Machine interface with an available serial interface (COM1 ... COM4) at the PC of the OXYCON.

Important: From January 2000 use h/p/cosmos coscom RS232 interface protocol



RS232 interface cable for OXYCON Ergospirometry Order-no.: 000 9701 0034 for 5 m length Order-no.: 000 9701 0035 for 10 m length

B Analog interface / Interface converter

An Interface Converter is available as an optional equipment.

The speed can be controlled by an external ECG or Ergospirometry with analogue voltages of 0 - 5 Volts (or 0 - 10 Volts) at the separate socket.

Furthermore analogue output signal for the speed of the ladder ergometer as well as an analogue signal for the heart rate of the subject is available for host equipment. So with this interface converter a complete analogue communication is possible.

For further details please contact the manufacturer or your local dealer.



interface converter: AD / DA / DD Order-no.: 000 9611 0027 (for all h/p/cosmos Running-machines)

C Printer protocol

Connect the printer (with a serial interface) via interface cable with the serial interface RS232 of the ladder ergometer.

Attention: For a printer with a parallel interface you will need a commercial interface-converter, available in every computer-store or at the manufacturer.

Order-no.: COS10056 (interface converter)

If Option 20: 8 is chosen (printer protocol see list of options), following data will be printed out via a serial printer::

Name:	http://www email@h-p- Training-/ Date: 14.0 Time: 16:2 Mode: manu	cosmos.com cosmos.com Test protocol 6.2002 5 al	m		
Name:					
Note:	Name:				
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Note:				
Time hh:mm:ss Distance km Speed km/h Elevation % Heartrate 1/min 00:00:00 0.000 0.9 0.0 085 00:00:05 0.001 1.2 0.0 089 00:00:10 0.007 7.8 0.0 097 00:00:15 0.021 10.0 0.0 105 00:00:20 0.035 10.0 0.0 122 00:00:25 0.049 10.0 0.0 124 00:00:35 0.077 10.0 0.0 133 00:00:40 0.091 10.0 0.0 133 00:00:50 0.118 10.0 0.0 133 00:01:55 0.132 10.0 1.0 137 00:01:05 0.159 10.0 1.0 139 00:01:10 0.173 10.0 1.0 144 00:01:25 0.214 10.0 1.0 142 00:01:10 0.278 10.0 1.0 144 00:01:25<					
Time Distance Speed Elevation Heartrate hh:mm:ss km km/h % 1/min 00:00:00 0.000 0.9 0.0 085 00:00:10 0.001 1.2 0.0 089 00:00:15 0.021 10.0 0.0 105 00:00:20 0.035 10.0 0.0 122 00:00:25 0.049 10.0 0.0 124 00:00:35 0.077 10.0 0.0 133 00:00:40 0.911 10.0 0.0 133 00:00:50 0.118 10.0 0.0 133 00:01:55 0.132 10.0 1.0 133 00:01:05 0.159 10.0 1.0 139 00:01:10 0.173 10.0 1.0 139 00:01:15 0.187 10.0 1.0 144 00:01:25 0.214 10.0 1.0 144 00:01:25 0.214					
Time hh:mm:ss Distance km Speed km/h Elevation % Heartrate 1/min 00:00:00 0.000 0.9 0.0 085 00:00:05 0.001 1.2 0.0 089 00:00:10 0.007 7.8 0.0 097 00:00:20 0.035 10.0 0.0 114 00:00:25 0.049 10.0 0.0 122 00:00:30 0.063 10.0 0.0 124 00:00:40 0.91 10.0 0.0 133 00:00:45 0.104 10.0 0.0 133 00:01:55 0.132 10.0 0.0 133 00:01:55 0.132 10.0 1.0 137 00:01:00 0.146 10.0 1.0 139 00:01:10 0.173 10.0 1.0 141 00:01:20 0.201 10.0 1.0 142 00:01:15 0.187 10.0 1.0 144 00:01:20 </th <th></th> <th></th> <th></th> <th></th> <th></th>					
Time hh:mm:ss Distance km Speed km/h Elevation % Heartrate 1/min 00:00:00 0.000 0.9 0.0 085 00:00:05 0.001 1.2 0.0 089 00:00:10 0.007 7.8 0.0 097 00:00:20 0.035 10.0 0.0 114 00:00:25 0.049 10.0 0.0 122 00:00:35 0.077 10.0 0.0 129 00:00:35 0.077 10.0 0.0 133 00:00:40 0.991 10.0 0.0 133 00:00:45 0.104 10.0 0.0 133 00:01:55 0.132 10.0 0.0 134 00:01:00 0.146 10.0 1.0 139 00:01:10 0.173 10.0 1.0 141 00:01:20 0.201 10.0 1.0 142 00:01:15 0.187 10.0 1.0 144 00:01:25<					
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D Heart rate measurement system

P=LAR.

- Please pay attention to the safety instructions in the instruction manual.
- Stop training immediately if feeling sick or dizzy and see your doctor.
- In the case of interference do not rely on the indicated values of the wireless Heart-Rate transmission

Note from POLAR for patients with pacemaker

The expert's report from the Pacemaker-Institute in Rothenberg / Germany stated, that a negative influance or danger for patients with implanted pacemakers is impossible. (Pacemaker-Institute, Rothenberg Süd 18, 82431 Kochel am See / Germany) Nevertheless we recommend all patients with pacemakers to consult their doctor before using the POLAR heart rate measurement system.

D1 Chest belt and transmitter

You can use all POLAR transmitters (coded and uncoded) with your ladder ergometer.

For treadmills with EPROM versions lower than V 3.01.2 an EPROM update is available for the use of coded transmitters.

Note: Even with using the coded senders the transmission of the heart rate to the ladder ergometer is still uncoded.

The transmitter is only activated if placed correctly on the body. The chest belt is washable. In this case loosen the belt from the transmitter. Please take care not to crush the two electrodes of the belt. After having loosened the transmitter off the belt, wash the belt and especially the electrodes with warm water and mild soap. Do not clean the electrodes mechanically. Do not use alcohol.

D2 Radius of transmission

The transmitter radius amounts to approx. 80 to max. 120 cm. If you run several ladder ergometers or other training devices on the same heart rate measurement system, you should keep a gap of at least 100 cm between the devices to exclude interference.

D3 Battery of the transmitter

At an average application of 2 hours per day the life-span of the battery amounts to approx. 1 year. The receiver is incorporated in the ladder ergometer and requires no battery. It is supplied by the ladder ergometer.

If an irregular pulse display occurs in spite of an unobjectionable technical condition, please check your pulse manually or in case of doubts see your doctor for a check.

D4 Correct placement of transmitter belt

Adjust the belt length so that the belt fits tightly but does not confine you. The belt should not loosen while exercising. Close the belt with transmitter placed outwards (POLAR-Logo in right position).

In order to allow an optimal skin contact the skin should be moist. Contact gel, as used for ECG, is an excellent solution. Moisten the two electrodes and the skin with water or contact gel, which is available in chemistries. Place the transmitter so that it is right below the pectoral muscle (chest), as is shown in the illustration below.



For ca. 85 – 88 % of the subjects the "normal" placement of the transmitter belt is recommended.

In case of transmission problems

- For ca. 10 15 % of the subjects the placement "POLAR-logo upside down" is recommended.
- For ca. 1 2 % of the subjects the placement "789 transmitter at the back of the subject" is recommended.

However, try the "normal" position always first.

E PC Software h/p/cosmos para control[®]

The Software h/p/cosmos para control[®] is a freeware, i.e. for h/p/cosmos customers free of charge. The Software is responsible for the UserTerminal functions on PC.

Fields of application

- remote control of all ladder ergometer functions during tests or exercise via RS232 interface from the PC
- demonstrations for big groups (students, audience, etc.) with the help of a big screen or beamer
- service & maintenance work, setup, programming and display of error codes (obligatory for ladder ergometers without hardware user terminal)
- testing the RS232 interface of the PC, testing the RS232 interface cable in case of communication problems between ECG or Ergospirometry



F PC Software h/p/cosmos para graphics®

The Software h/p/cosmos para graphics[®] permits an on-line registration and administration of Heart-Rate-values and endurance-parameters. The ladder ergometer can be controlled automatically.

The data can be converted by the software and be taken over and evaluated e.g. by EXCEL. A take over and processing of the data within a table calculation program, the software h/p/cosmos para analysis or an editor is also possible with the help of the h/p/cosmos para graphics[®].

Further information is available in the separate instruction manual of the software h/p/cosmos para graphics[®]. You can also order a demo version for some tests.

For the data transmission a connection cable from the ladder ergometer to the personal computer is needed. This connection cable is available as optional equipment (see also optional equipment serial interface).



G PC Software h/p/cosmos para analysis®

The Software h/p/cosmos para analysis is a sportsmedical evaluation program for performance diagnostics. The graphical and table evaluation of heart rate and lactate curves after load profiles is based on individually selected threshold models. Further information at www.h-p-cosmos.com



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Certificates and norms

CEPTNФИКАT CERTIFICADO CERTIFICAT ٠ ŧ 旧 ZERTIFIKAT

CERTIFICATE

CERTIFICATE



No. 01Z 01 09 45283 001

TÜV PRODUCT SERVICE GMBH certifies that the company

H-P-Cosmos Sports & Medical GmbH

Am Sportplatz 8 83365 Nussdorf - Traunstein

in the facilities:

83365 Nussdorf - Traunstein

within the scope: Development, production, distribution and service of treadmill ergometers for medicine and sports

has established and is maintaining a quality system which meets the requirements of:

EN 46001: 1996

Quality Systems - Medical Devices -Particular Requirements for the Application of

ISO 9001: 1994

as documented in audit report no. 70018150.

This certificate is valid until 08/2004.

Munich, 10-23-2001

TÜV PRODUCT SERVICE GMBH ACCREDITED CERTIFICATION BODY FOR QUALITY SYSTEMS Akkreditiert durch ***** CHARACHER CHARA

EC Certificate No.: G1 01 10 45283 002



Decision according to Annex II, Clause 3 of Council Directive 93/42/EEC concerning medical devices.

The Certification Body of TÜV PRODUCT SERVICE certifies that

H-P-Cosmos Sports & Medical GmbH Am Sportplatz 8

83365 Nussdorf - Traunstein

in the facility

- H-P-Cosmos Sports & Medical GmbH D-83365 Nussdorf - Traunstein

for the product category

Development, production, distribution and service of treadmill ergometers for medicine and sports

maintains a quality system which ensures that the products conform with the essential requirements of the Directive, which apply to them at every stage from design to final controls.

Reasoned assessment see audit report no.: 70018150.

Provided the agreed periodical surveillance is carried out, this certificate is valid until 01-31-2004.

23.10.2001

Released with the above mentioned certificate number by the Certification Body of TÜV PRODUCT SERVICE.

Department: Date:



TÜV PRODUCT SERVICE GMBH is Notified Body according to Council Directive 93/42//EEC concerning medical devices with identification no. 0123.

TÜV PRODUCT SERVICE GMBH · Zertifizierstelle · Ridlerstrasse 65 · D-80339 München

CE

Certificate of compliance

for Sports- & Fitness Machines

Manufacturer

h/p/cosmos sports & medical gmbh Am Sportplatz 8 83365 Nussdorf-Traunstein / Germany phone +49 / 86 69 / 86 42-0 fax +49 / 86 69 / 86 42-49 email@h-p-cosmos.com www.h-p-cosmos.com

Product ladder ergometer

Types h/p/cosmos discovery 4.0 h/p/cosmos discovery It 4.0

We herewith declare that the above mentioned products meet the following standards: EC-Council- Directive 89/336 Electromagnetic compatibility.

The **C** \in -mark gets affixed to the products according to appendix I of the EC-Council- Directive 89/336/EEC.

Following standards are applicable: EN 60 335-1, EN 60 601-1-2: 11.2001, VDE 0701, EN 60 204-1 (= VDE 0113), EN 60 601-1-4, EN 957 / 1, EN 957 / 2, EN 957 / 6, DIN EN ISO 9001, EN 61 000-3-2 / 3

Nussdorf-Traunstein, 23.04.2002

ion the

Franz Harrer President

Ludwij Finenwenger

Ludwig Fritzenwenger Safety Representative for Medical Devices

C € 0123

Certificate of compliance for devices for medical and rehabilitation purposes

Manufacturer

h/p/cosmos sports & medical gmbh Am Sportplatz 8 83365 Nussdorf-Traunstein / Germany phone +49 / 86 69 / 86 42-0 fax +49 / 86 69 / 86 42-49 email@h-p-cosmos.com www.h-p-cosmos.com

Product ladder ergometer

Type h/p/cosmos discovery med 4.0 h/p/cosmos discovery It med 4.0

Classification according to RL 93 / 42 EWG: Class IIb

We herewith declare that the above mentioned products meet the provisions of the EC Council Directive 93/42 EEC (Medical Device Directive).

The appendix II of the Directive 93/42 EEC from June 14, 1993 is being applicable.

Following standards are applicable: EN 60 601-1, VDE 0751, EN 60 601-1-2, EN 60 204-1 (= VDE 0113), EN 60 601-1-4, EN 14 971, EN 957 / 1, EN 46 001, EN 957 / 2, EN 957 / 6 und DIN EN ISO 9001.

Nussdorf-Traunstein, 23.04.2002

som for

Franz Harrer President

Ludwij Fikenwenger

Ludwig Fritzenwenger Safety Representative for Medical Devices

Contact

For additional orders and technical enquiries please have the model type, the serial number and the date of installation of your treadmill ready.

Service

phone	0 86 69 / 86 42-25
fax	0 86 69 / 86 42-49
email	service@h-p-cosmos.com

Sales

phone	0 86 69 / 86 42-0
fax	0 86 69 / 86 42-49
email	sales@h-p-cosmos.com

Address

h/p/cosmos sports & medical gmbh

Am Sportplatz 8 DE 83365 Nussdorf-Traunstein Germany

phone 0 86 69 / 86 42-0 fax 0 86 69 / 86 42-49 email@h-p-cosmos.com www.h-p-cosmos.com