h/p/cosmos®

mercury® med

original instruction for use
treadmill h/p/cosmos® 150/50

IMPORTANT! READ CAREFULLY BEFORE USE!
KEEP FOR FUTURE REFERENCE!

firmware version: v1.07.x
article number: cos105000_150_50_med_en
revision: 1.00

run ahead of time®

These instructions for use are only valid for the original configuration of the first delivery of the devices pictured below.
If the device has been changed, please refer to the latest version of this document, available at:
www.h-p-cosmos.com

Product family: treadmill h/p/cosmos 150/50

Models:

stratos® lt med
[cos30000va05]

stratos® med
[cos30000va06]

mercury® lt med
[cos30000va07]

mercury® med
[cos30000va08]

locomotion® 150/50 E med
[cos30001va01]

locomotion® 150/50 DE med
[cos30001-01va02]

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

Dear customer,

Thank you for choosing this premium device.

Since its establishment in 1988, h/p/cosmos® has strongly influenced sports, athletics, ergometry, rehabilitation, and science through the development and distribution of new products, software, system solutions, and application methodologies.

During this time the company, based in Traunstein, Germany, has developed into THE German specialist for manufacturing treadmill ergometers and systems for fitness, sports, sports science, sports medicine, athletics, biomechanics, medicine, rehabilitation, therapy, ergometry, performance diagnostics, and scientific research.

Many developments and pioneering work from h/p/cosmos® have influenced not only product design and functionality but also their usage and methodologies.

Your success with our devices is the primary goal of h/p/cosmos.

This is why we offer individual devices as well as comprehensive system solutions.

You will find a wide range of options and accessories in these instructions for use and at www.h-p-cosmos.com.

At h/p/cosmos, the quality and safety of our products is our highest priority.

These instructions for use include all of the information needed to operate the device correctly and safely.

Please read them carefully before use and keep them available at all times.

We hope you will have a lot of fun and success as you work with your h/p/cosmos device.

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

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1 Symbols and Labels

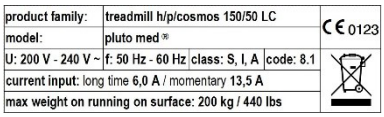
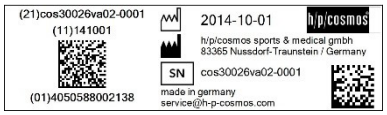
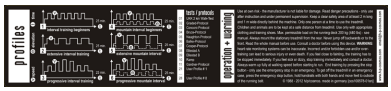
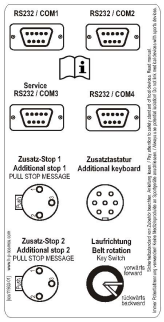
1.1 Symbols used (general)

Illustraion	Description	Reference
CE 0123	CE sign, proof that the essential requirements (here with number of notified body) were met	(according to medical device directive 93/42/EEC)
	General warning (danger, warning or caution statements)	(DIN EN ISO 7010 W001)
	Warning of obstacles (stumbling)	(DIN EN ISO 7010 W007)
	Warning of electrical voltage	(DIN EN ISO 7010 W012)
	Warning of counter rotating rollers (trapping zones)	(DIN EN ISO 7010 W025)
	Follow instructions for use	(DIN EN ISO 7010 M002)
	Potential equalization	(IEC 60445)
	Protection ground	(IEC 60417-5019)
	Alternating current (AC)	(IEC 60417-5032)
	Applied part of type B	(IEC 60417-5840)
	Connection point for Neutral line	(IEC 60445)
	Manufacturer	(ISO 15223-1)
2015-10-01	Manufacturing date	(ISO 15223-1)
	Separate collection for electrical and electronic equipment	(2012/19/EU)

1.2 Symbols used (transport)

Illustraion	Description	Reference
	Fragile, Handle with care	(ISO7000-0621)
	This way up	(ISO7000-0623)
	Keep dry	(ISO7000-0626)
	Centre of gravity	(ISO7000-0627)
	Temperature limitations	(SO7000-0632)
	Do not stack	(ISO7000-2402)

1.3 Labels on device

Illustraion	Description	Reference
	name plate	-
	UDI name plate	-
	label "caution danger zones"	cos10508-03
	label "before opening disconnect mains"	cos11880
	label "follow instructions"	cos101380
	label "potential equalization"	cos101594
	label “inspection 20xx” + base label	cos14543-20xx + cos11787
	label "adjust running belt"	cos10512
	label "limit running belt shaft cover"	cos102466-01
	operation & safety instructions	cos100578-01-xx
	label "rear panel UserTerminal 5B outs."	cos11933-01
	label "h/p/cosmos address"	cos10144-01

2 Description

2.1 Illustration

No.	Description
1.	UserTerminal
2.	Pull cord safety stop (ripcord / safety lanyard)
3.	Emergency off
4.	Crossbar-frontrail
5.	Side handrail
6.	Motor cover
7.	Foot rail
8.	Non slip surface
9.	Running deck
10.	Running belt
11.	Rear roller
12.	Rear roller protective cover
13.	Marking of running surface
14.	Safety arch
15.	Safety harness

2.2 Function

The treadmill has two essential performance characteristics: Speed and elevation.
The rotation of the running belt represents the speed.
The raising of the whole treadmill frame incl. running deck enables the elevation.
Both parameters are manually adjustable on the UserTerminal.
Furthermore, operation is possible via pre- and self-defined modes.
Operation is also possible via external devices (PC, ECG, etc.).
The chapter “operation” gives a detailed description of all functions.
The chapter “technical data” shows technical details.

The treadmill is driven by powerful motors.
For that reason it is very important to follow the safety information, in order to avoid injury or death.

As previously described, the treadmill contains a number of standardized protocols.
Nevertheless, the treadmill does not provide recommendations for treatment.
The decision regarding the correct load is the responsibility of the medical doctor.
Depending on the application, the load includes speed, elevation, distance, heart rate, body weight or motion support, etc..

3 Intended Use

3.1 Intended use

h/p/cosmos medical treadmills are intended for walking or running in place for

- Recreational fitness training
- Gait training (with or without body weight support)

h/p/cosmos medical treadmills can be used in combination with external devices for walking or running in place as

- Loading devices for neuromuscular and biomechanical measurements (e.g. EEG, EMG, motion analysis)
- Loading devices for cardiovascular measurements (e.g. ECG)
- Loading devices for cardiopulmonary measurements (e.g. ergospirometry)

For any medical treadmill application, a fall prevention system is prescribed and absolutely obligatory.
The subject of a medical application is not neccissarily a patient.
Therefore these instructions for use will use the term “subject” for patients as well as for athletes under test.

h/p/cosmos medical treadmills may be operated with healthy subjects for non-medical uses in non-medical environments as well.
For use with healthy subjects, please apply the instructions for use for sports devices, available at
www.h-p-cosmos.com

3.2 Intended operator

- Medical staff only
- that has been carefully trained according to these instructions for use
- that is working according to the prescription of the medical doctor, where applicable and necessary
- The subject is not the intended operator.

  But the intended operator is authorized to allow the subject to control the device according to the instructions of the intended operator and under the permanent observation of the intended operator.

  This means the operation of the device remains the responsibility of the intended operator at all times, taking the physical and mental condition of the subject into account.

  The intended operator has to be within reach of at least one emergency stop / off at all times.

3.3 Intended location

- Medical facilities only
- No use at home or in home healthcare environments (acc. to IEC 60601-1-11)
- No outdoor use
- No direct sunlight
- Sufficiently lighted for proper readability of warning, labels, displays and operation elements
- Proper environmental conditions (see “Technical Data”)
- Stationary training equipment: Not moved during use

3.4 Intended duration

- Depending on the prescription of the medical doctor

3.5 Contraindications

Absolute contraindications

(have to be excluded before the treadmill is used)

- Acute myocardial infarction (within 2 days)
- Instable angina pectoris
- Cardiac arrhythmia pathology and/or limited hemodynamics
- Symptomatic massive aortic stenosis
- Uncompensated / uncontrolled heart insufficiency
- Acute pulmonary embolism or pulmonary infarction
- Acute endocarditis, myocarditis, pericarditis
- Acute aortic dissection
- Acute coronary syndrome
- Acute phlebothrombosis of the lower extremities
- Febrile infections
- Pregnancy
- Acute thrombosis
- Fresh wounds e.g. after surgery
- Acute fracture
- Damaged disc or traumatic disease of the spine
- Epilepsy
- Inflammations
- Acute migraine

Relative contraindications

(The application may be started if the possible benefits exceed the risks.
The decision has to be made by the medical doctor before the treadmill is used)

- Left main coronary stenosis
- Main artery disease
- Cardiac valve disease of moderate severity
- Known electrolyte imbalance
- Arterial hypertonia (RR > 200 mm Hg syst. > 110 mm Hg diast.)
- Tachyarrhythmia or bradyarrhythmia
- Hypertrophic cardiomyopathy and other forms of outflow tract obstruction
- Higher degree atrioventricular AV-blocking
- Anemia
- Physical and/or mental disabilities leading to inability to exercise adequately
- Partially invasive medical devices (probes, infusions, catheters, external fixators, etc.)
- Cardiac pacemaker
- Visual impairment (vision < 30% acc. to WHO)

Further contraindications may occur. This has to be evaluated by the medical doctor.
In case of relative contraindications permanent observation of the subject by medical staff is obligatory.

Sources:
http://leitlinien.dgk.org (German Cardiac Society)
www.acc.org (American College of Cardiology Foundation)
www.americanheart.org (American Heart Association)
http://my.americanheart.org/idc/groups/ahaecc-internal/@wcm/@sop/documents/downloadable/ucm_423807.pdf

4 Safety

h/p/cosmos medical treadmills may be operated with healthy subjects as well.

For applications with healthy subjects, please apply the instructions for use for sports devices, available at www.h-p-cosmos.com

4.1 Safety information – Forbidden use

Obey the following danger, warning and caution statements stricktly in order to prevent serious injury or death!

- For any medical treadmill application, a fall prevention device is prescribed and absolutely obligatory.
- Do not use the safety harness on bare skin.
- WARNING! Heart rate monitoring systems may be inaccurate.
- Incorrect or over exercising may result in serious injury or death.
- Advice the subject If you feel faint or dizzy stop exercising immediately and consult a medical doctor.
- Exclude overloading or overstressing of the subject.
- Only carefully trained medical staff is allowed to use the device.
- The subject has to be checked by a medical doctor before using the device.
- A defibrillator must be present at any time.
- The intended operator has to be in reach of at least one emergency stop/off at any time.
- Obey all information given in these instructions for use.
- Do not use the device against the intended use.
- Do not use the device in case one or more of the listed contraindications prevail.
- In case of relative contraindications permanent observation of the subject by medical staff is obligatory.
- Neither subject nor operator must be under the influence of alcohol, drugs or anesthetics.
- Start the use of the treadmill with slow walking, especially for beginners.
- Make sure the space under the treadmill is free from persons, body parts or objects, especially when switching on (treadmill will lower during initialization) and when changing the elevation.
- Do not enter the device when running belt is rotating.
- Do not step on rear roller.
- Do not stand on or enter the running deck when device is in elevation (running belt might slip through due to gravity).
- Make sure no towels, jewellery, cell phones, containers with liquid etc. can fall into the device or onto the running surface.
- Do not enter the device without appropriate shoes without high heels, spikes or studs.
- Do not use the device with wheels (bikes, wheelchairs, inline skates, etc.).
- Do not turn around, walk sideways or backwards; do not jump on or off the running belt while it is in motion.
- Do not touch the running belt while it is in motion (besides contact with feet).
- Do not lean on the UserTerminal - do not apply pressure to the displays - press keys softly.
- Ensure assist mean, accessories, cables etc. do not extend into the running area.

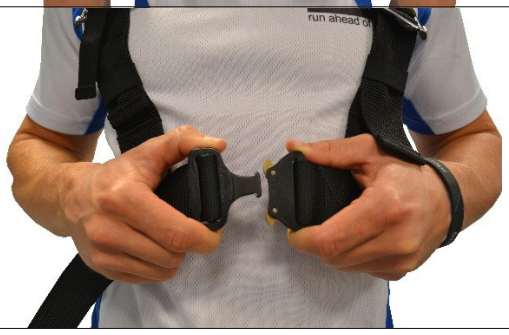
- Do not insert metal objects such as a pin or a wire into any gap or any outlet on the device.
- Do not touch the subject and external electrical devices at the same time.
- Always the latest command will be executed, regardless of whether it came via interface or from the UserTerminal during one of the four modes. Only stop command has higher priority and cannot be overwritten.
- WARNING: To avoid the risk of electric shock, this equipment must only be connected to a supply mains with protective earth.
- WARNING: Do not use portable high frequency communication devices in the subject environment (see “position of subject and user”). Disregard can cause loss of performance.
- Free standing equipment has to be installed on a stable and levelled base.
- Choose proper floor, clothing and humidity, in order to prevent electrostatic discharge (also see technical data).
- Do not use the device without instruction by authorized personnel acc. to the instruction protocol.
- Regard safety area behind device of 2.0 m x width of treadmill.
- Do not use the device with children <12 months.
- Exclude access of unsupervised children (< 14 years) onto or near any parts of the device (incl. accessories, packaging, lubrication and service material).
- In case of application with children (> 1, < 14 years) permanent observation of the subject by medical staff is obligatory.
- Animals must not be in the same room with the device.
- The automatic modes must only be performed on the prescription of the medical doctor.
- Operator and subject have to be aware of automatic load changes during profile, cardio and test mode.
- During stress tests a medical doctor has to be available at any time.
- Unmeant trapping hazards: Take off ties, scarfs or other clothes that may be trapped. Secure long hair and ribbons during maintenance and training in order to prevent being captured in trapping zones.
- Perform a daily visual inspection (see chapter “maintenance”).
- Obey the maintenance intervals claimed in chapter “maintenance”.
- Obey the competences claimed in chapter “maintenance”.
- A second person has to be present during maintenance.
- In case of any visible or assumed defects or malfunctions (of the device, accessories, software, etc.), unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.
- In case of any visible or assumed wear and tear (of the device, accessories, labels, etc.), unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.
- In case of any fluid entering into the device, unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.
- Do not modify the device, configurations, accessories or software in any way.
- Do not connect any devices, accessories or software, not listed in “accessories / compatible devices”.
- Disinfect the device before and after every treatment.
- Disconnect the device and all accessories from mains power supply before cleaning or disinfection.

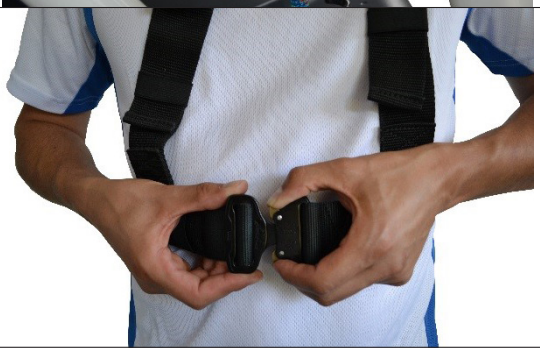
4.2 Fall prevention devices

A fall prevention device is the only effective way to protect the subject from falling.
For any medical treadmill application, a fall prevention device is prescribed and absolutely obligatory.
h/p/cosmos provides fall prevention devices in the form of a safety arch or a body weight support device (airwalk).
It is up to the operator to use any other device that prevents the subject from falling and complies with IEC60601-1.
The pull-cord safety stop is not a fall prevention.

Treadmill with safety arch	Body weight support device airwalk®

Further information see “Annex III (accessories)”

Description	Illustration
Put on the safety harness so that the h/p/cosmos logo is at the front.	
The h/p/cosmos logo has to be visible in the back as well.	
Close buckles.	

Description	Illustration
Tighten shoulder and chest straps.	
Use carabiner to connect safety harness with rope.	
Explain function to subject. Adjust the length of the rope in a way the subject has to maintain the correct position (see “position of subject and operator”). Secure rope with rope arrest.	
In order to re-open the buckle, press the fastener with thumb and index finger.	

4.3 Emergency dismount

Subject is conscious and aware of danger.

- Subject grabs the handrails
- Subject jumps off the running belt onto the foot rails
- Operator / subject hits the emergency off

Subject is conscious but not aware of danger.

- Subject stumbles and falls into fall prevention device.
- Treadmill stops
- Operator / subject hits the emergency off
- Operator helps subject stand up again.
- Operator helps subject exit the device.

Subject lost consciousness and is hanging in the fall prevention device.

- Hit the emergency off.
- Call a medical doctor.
- Call one or more persons, strong enough to carry the subject.
- Inform the third person that you will open the buckle of the safety harness
- Open the buckle of the safety harness.
- Subject will slide into the other person’s arms.
- Render first aid.

4.4 Emergency off

Do only use in case of emergency.

Do not use as normal stop button.

Do not stand on or enter the running deck when device is in elevation (running belt might slip through due to gravity).

	Operation	Result	Release	Restart
UserTerminal		Power supply to load generating components interrupted Running belt spins out (until 0 km/h) with undefined deceleration Movement of elevation system stops UserTerminal off Interface communication interrupted		 Switch the device on.
	Push button		Pull button	Restart application.

The operator has to be in reach of the emergency off at any time.

If the operator is not able to reach the emergency off button at the UserTerminal (body height, obstacles, etc.), the operator must install an additional emergency stop within reach (see accessories).

4.5 Emergency stop

Do only use in case of emergency.

Do not use as normal stop button.

Do not stand on or enter the running deck when device is in elevation (running belt might slip through due to gravity).

	Operation	Result	Release	Restart
Safety arch		Running belt stops with predefined deceleration Movement of elevation system stops UserTerminal displays “pull stop” Mains connection and Interface communication not interrupted		 Restart application
	Pull rope		Release rope	
Pull cord safety stop				
	Pull rope		Reconnect rope	

4.6 Unauthorized access

See OP 40 … 44 in the User Options to lock the whole device or individual modes.

4.7 Residual risk / Side effects

After risk reduction only 13 of more than 230 causes are in the "widely acceptable" region.

In case fall prevention is not applied or not applied correctly, there are residual risks, such as falling of a person resulting in skin abrasions, bruises, fractures or in worst case even death.

Furthermore there is residual risk such as unintended overload of the subject caused by wrong operation, wrong assessment, or wrong application of the operator and also incorrect data transfer (e.g. electromagnetic interferences, software failure, etc.). Even the best software and hardware safety concepts can never completely rule out a failure of software or hardware and thereby a theoretically possible overloading of the subject.

Since the treadmill is an electrically operated device, an electric shock, which might result in death can never be ruled out, although the design and verification is according to the relevant standards for electrical safety of medical devices, an electric shock, which can result in death, can never be ruled out completely.

The residual risk of strangulation can not be excluded as well. The risk is reduced by safety information within the IFU.

It cannot be excluded that unintended or forbidden use might cause further not yet regarded risks and that already regarded risks might have been estimated incorrectly. It can also not be excluded that the daily use of the medical product might show further risks.

In ergometry, diagnostics and therapy there are alternatives to treadmill application such as bicycle ergometry (without natural gait movement) or overground gait therapy (secured only by the therapist), etc. the benefit of treadmill training in contrast to these alternatives is clearly outweighing the residual risk of falling or overload with the known consequences.

In this risk analysis the "present state" of the device has been evaluated.

Having carried out the evaluation and validation of the product, the risk of appearance of a not acceptable risk is very low.

The device (it´s construction, it´s function as well as the intended application) does - under normal conditions - not represent any unjustifiable risk for the subject, the user, the operator or third persons.

4.8 Firefighting

Do not use liquid firefighting resources.

Use CO2.

4.9 All-pole disconnection

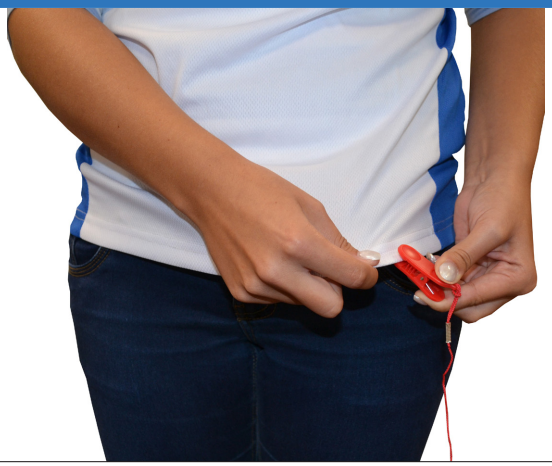
The following options are available for all-pole disconnection:

- Unplug device from power socket.
- Switch off device protection switch

Maintain enough free space to ensure access to cables and the circuit breaker (see “position of subject and operator”).

5 Preparation

Description	Illustration
Perform daily inspection as described in “daily inspection”.	
Explain device and application to subject.	
Explain and apply fall prevention as described in “fall prevention”.	
Guide subject onto treadmill. ▮ Do not enter the device when running belt is rotating. ▮ Do not step on rear roller. ▮ Do not stand on or enter the running deck when device is in elevation (running belt might slip through due to gravity). If possible, the subject should hold both handrails for stability when entering the treadmill. Holding handrails during use affects exercise results.	

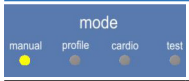
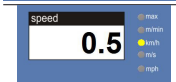
Description	Illustration
Apply pull-cord safety stop. (Attach clip to subject clothing.) Adjust the length of the rope so that the subject has to maintain the correct position (see “position of subject and operator”).	

5.1 Further preparation locomotion

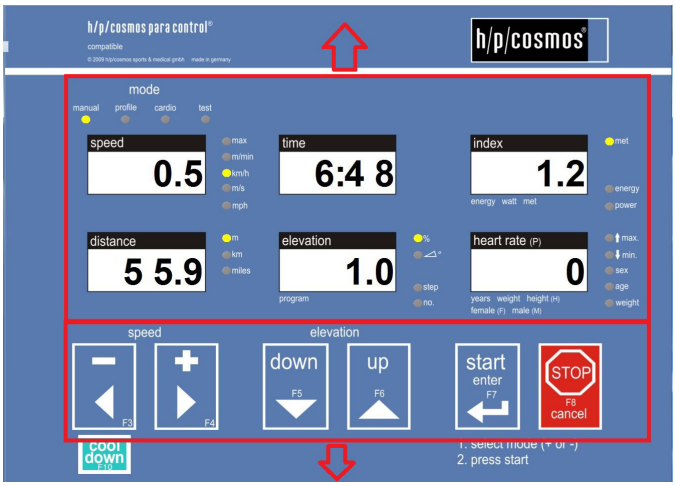
Description	Illustration
Adjustment of handrails ▮ Pull lever ▮ Push button ▮ Adjust handrails ▮ Release button ▮ Push lever	
Adjustment of therapist seats ▮ Release fixation ▮ Adjust seat ▮ Tighten fixation	
Adjustment of foot rest ▮ Release fixation ▮ Adjust foot rest ▮ Tighten fixation	

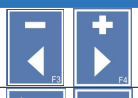
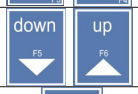
6 UserTerminal

6.1 Keys and displays

Element	Primary function	Secondary functions
	Displays currently activated mode	-
	Displays current speed in m/min, km/h, m/s or mph (see LED)*	Displays max. speed when selecting modes
	Displays covered distance in m, km or miles (see LED)*	-
	Displays elapsed time in minmin:ss or hh:minmin	Displays duration when selecting profiles
	Displays current elevation in % or degrees (see LED)*	Displays current profile step / number (see LED)
	Displays MET, energy and power in MET, kJ or Watt (see LED)	-
	Displays measured heart rate	Displays parameter when setting cardio mode or UKK walk test

The displays may show service information and error messages as well (see “trouble shooting”).
*adjust units and decimals with OP 12-14



Element	Primary function	Secondary functions
	Decrease / increase current speed	Navigate through settings, adjust parameters
	Decrease / increase current elevation	See “interfere with automatic program”
	Start the operation	Confirm setting (“enter”)
	Stop the operation Not an emergency stop / off!	Abort setting (“cancel”) Exit user options (“cancel”)
	See “emergency off” In case of emergency, press the emergency off button!	-

Depending on the operation mode, the keys have additional functions (see “operation”).
Press the keys softly. As confirmation, you will hear a beep.
Always the latest command will be executed, regardless of whether it came via interface or from the UserTerminal during one of the four modes. Only stop command has higher priority and cannot be overwritten.

6.2 Standard vs. “lt” devices

Most h/p/cosmos treadmills are available as standard or “lt” (light) devices.
“lt” devices have no UserTerminal (no display, no keyboard).

Standard device	“lt” device
Control via - UserTerminal - Software (see “accessories”) - additional keyboard (see “accessories”) - ECG, spirometry, etc. (see “compatible devices”)	Control via - Software (see “accessories”) - additional keyboard (see “accessories”) - ECG, spirometry, etc. (see “compatible devices”)

6.3 Connection of external devices / Interfaces

The back of the UserTerminal has RS232 interfaces.

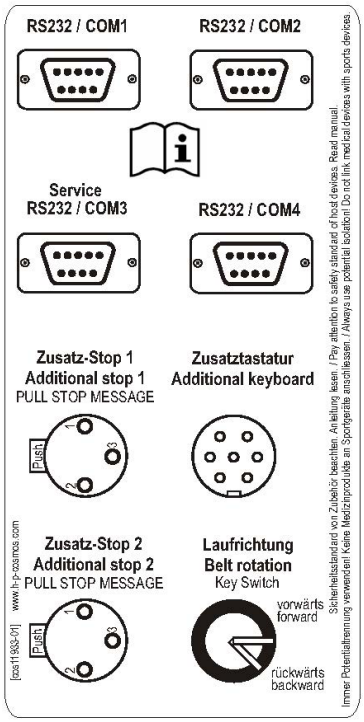
For USB-RS232 converter, see “accessories”.

The person combining a medical device with any other device for the first time is creating a Medical Electrical System.

Requirements for ME-Systems, see “creating systems”.

Additional interfaces are located at the rear of the UserTerminal.

Unused RS232 interfaces must be covered with dust caps [cos102973] for isolation purposes..

Description		Illustration
RS232 / COM1 Possible connection of external devices. (standard)	RS232 / COM2 Possible connection of external devices. (optional)	
Additional Stop 1 Possible connection for emergency stop devices.	Possible connection for remote control	
Additional Stop 2 Possible connection for emergency stop devices.	Possible key switch for belt rotation	

7 Position of Subject and Operator

1) Position of subject (initial contact)

1a) Optimal position	40%, front	
1b) Tolerated position	30%, middle	running area
1c) Not tolerated position / buffer zone	30%, rear	

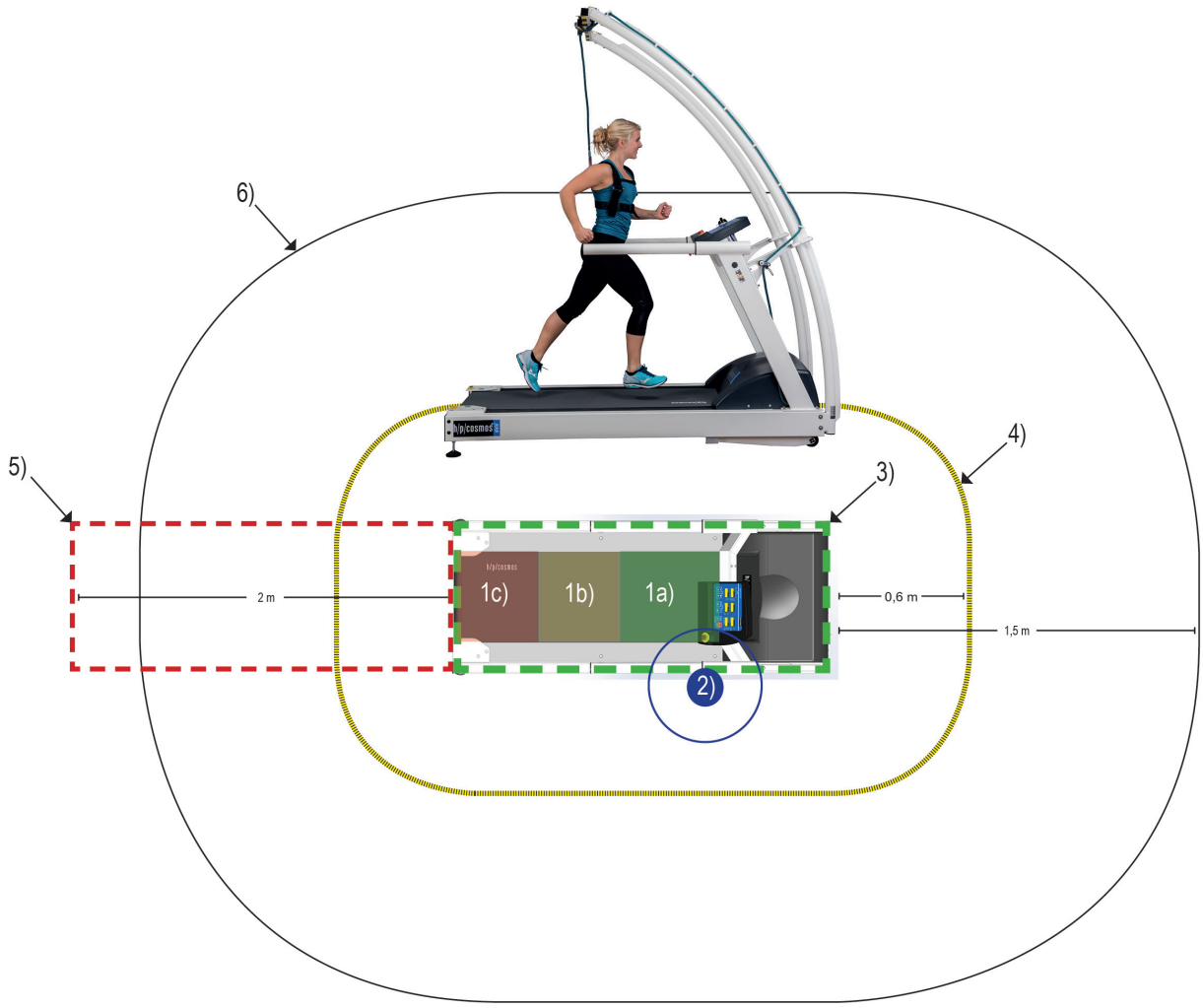
2) Intended position of operator

The operator must be within reach of the emergency off at all times.
If the operator is not able to reach the emergency off button at the UserTerminal (body height, obstacles, etc.), the operator must install an additional emergency stop within reach (see accessories).

3)	Training area	acc. to ISO 20957-1	subject + device	
4)	Free area	acc. to ISO 20957-1	training area + 0.6 m	must be free at all times (except operator)
5)	Safety area	acc. to DIN EN 957-6	2.0 m behind device	must be free at all times (except operator)
6)	Patient environment	acc. to IEC 60601-1	device + 1.5 m	

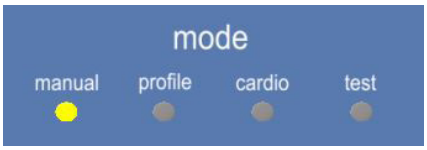
There must be no electrical devices within this area, which are not part of an ME-System with the device.

Do not touch the subject and external electrical devices at the same time.



8 Operation

8.1 General application procedure

Description	Illustration
Disinfect the device (see “cleaning”). Disconnect the device and all accessories from mains power supply before cleaning or disinfection.	
Make sure… …the PE-cable is connected to electrical installation and device, …the device is directly plugged into the dedicated wall socket, …the expulsion fuse on the front of the device is switched on, …all emergency offs are released.	
Switch the running machine on with the on/off switch (light goes on). Make sure the space under the treadmill is free from persons, body parts or objects, especially when switching on (treadmill will lower during initialization) and when changing the elevation. Normal condition: When starting, all displays show “0”-values.	
Select an operation mode. For a detailed description, see following chapters.	
Perform application.	-
Switch the running machine off with the on/off switch (light goes off)	
Disinfect the device (see “cleaning”). Disconnect the device and all accessories from mains power supply before cleaning or disinfection.	

8.2 Overview of operation modes

For control, remote control and supervising purposes the free PC software para control is available.

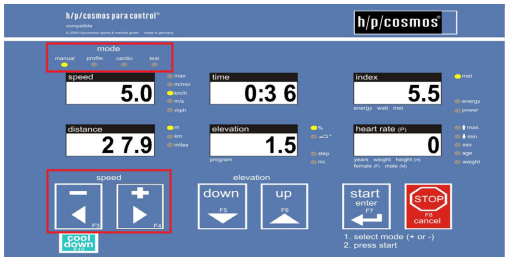
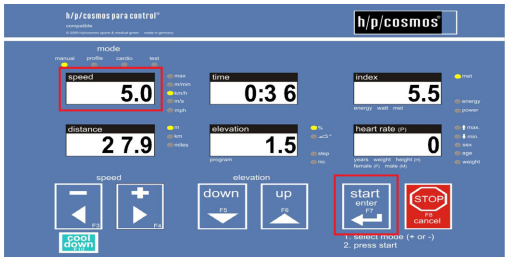
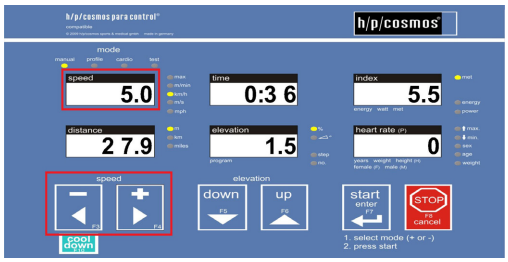
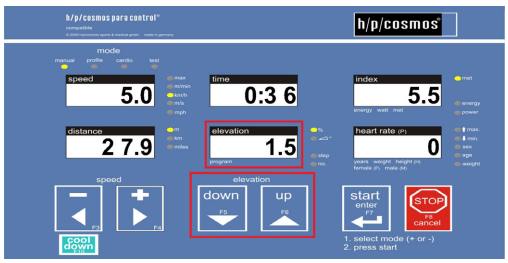
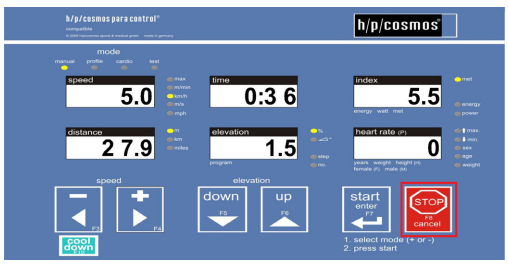
Manual mode	
Select mode	
Confirm mode	
Select speed	
Select elevation	
Terminate application	

Profile mode	
Select mode	
Confirm mode	
Select profile	
Confirm profile	
Terminate application	

Cardio mode	
Select mode	
Confirm mode	
Adjust parameters, indicated by LEDs	
Confirm profile	
Terminate application	

Test mode	
Select mode	
Confirm mode	
Select test	
Confirm test	
Terminate application	

8.3 Manual mode

Basic functions	Buttons / displays	Further information
Select “manual mode” with “+” or “-“ button Selected mode flashes.		Device must be in “mode selection” (one of the mode LEDs flashes) To get there, cancel all other activities by pressing the “stop”-button.
Confirm with “enter” Running belt starts with predefined starting speed (default = 0.5 km/h).		To predefine starting speed, see OP09 in “User Options”. To request body weight for calculation of energy and power, see OP16 in “User Options”.
Confirm with “enter” Running belt starts with predefined starting speed (default = 0.5 km/h).		Pressing and holding the key accelerates with defined acceleration level (see “acc. levels”). Decelerate to 0 km/h to pause the operation (see “pause function”).
Adjust elevation with “up” or “down“ Current elevation is displayed in “elevation” display		
Terminate the operation with “stop”		To predefine stop time, see OP08 in “User Options”.

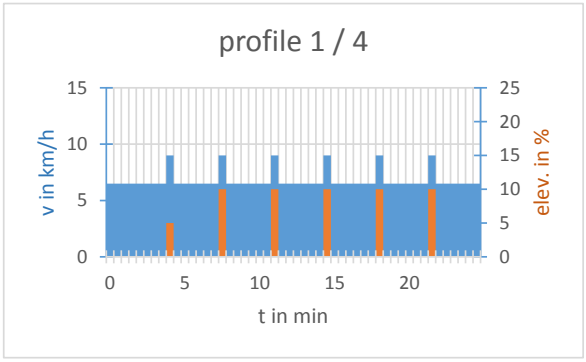
8.4 Profile mode

- The automatic modes must only be performed on the prescription of the medical doctor.
- Operator and subject have to be aware of automatic load changes during profile, cardio and test mode.

Start and load changes within the automatic modes are indicated by acoustic signals (beep).
Furthermore, the displays show the next load parameters (flashing).
The profile mode covers six load profiles, representing interval training sessions.
These basic profiles are scalable (see OP11 in “User Options”, default = off).
Scaled profiles cannot be stored. For self-defined tests see “test mode”.

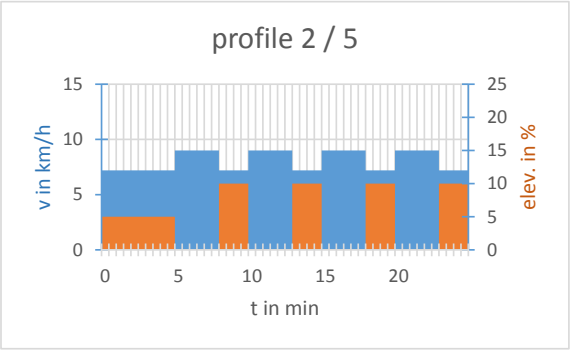
Profiles 1 and 4 (profile 1 without elevation)

step	v in km/h	t in min	elev. in %
1	6.5	04:00	0
2	9.0	00:30	5
3	6.5	03:00	0
4	9.0	00:30	10
5	6.5	03:00	0
6	9.0	00:30	10
7	6.5	03:00	0
8	9.0	00:30	10
9	6.5	03:00	0
10	9.0	00:30	10
11	6.5	03:00	0
12	9.0	00:30	10
13	6.5	03:00	0



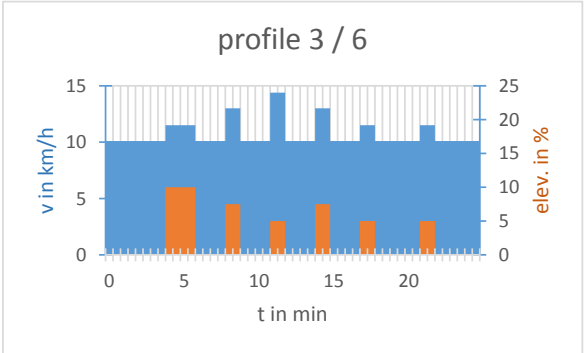
Profiles 2 and 5 (profile 2 without elevation)

step	v in km/h	t in min	elev. in %
1	7.2	05:00	5
2	9.0	03:00	0
3	7.2	02:00	10
4	9.0	03:00	0
5	7.2	02:00	10
6	9.0	03:00	0
7	7.2	02:00	10
8	9.0	03:00	0
9	7.2	02:00	10



Profiles 3 and 6 (profile 3 without elevation)

step	v in km/h	t in min	elev. in %
1	10.1	04:00	0
2	11.5	02:00	10
3	10.1	02:00	0
4	13.0	01:00	7.5
5	10.1	02:00	0
6	14.4	01:00	5
7	10.1	02:00	0
8	13.0	01:00	7.5
9	10.1	02:00	0
10	11.5	01:00	5
11	10.1	02:00	0
12	11.5	01:00	5
13	10.1	04:00	0



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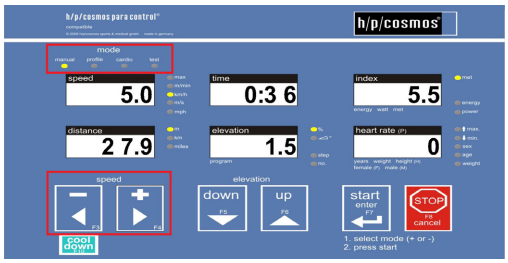
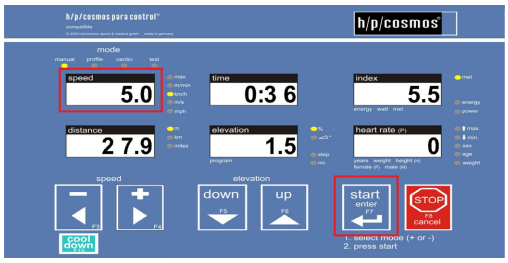
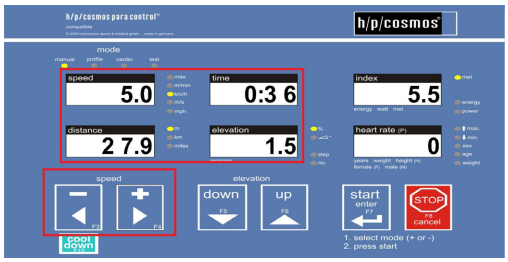
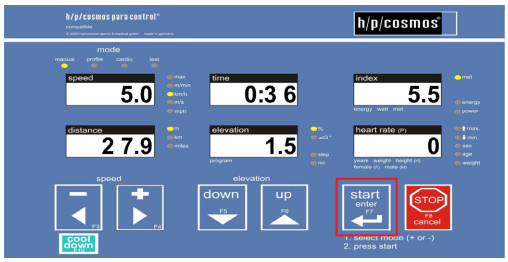
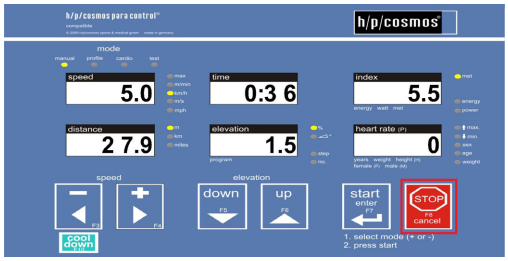
Basic functions	Buttons / displays	Further information
Select “profile mode” with “+” or “-“ button. Selected mode flashes.		Device must be in “mode selection” (one of the mode LEDs flashes) To get there, cancel all other activities by pressing the “stop”-button.
Confirm with “enter”. Profile 1 is displayed.		
Select profile with “+” or “-“. Current profile is displayed in “elevation” display. Max. speed is displayed in “speed” display. Duration is displayed in “time” display.		
Confirm with “enter”. The selected profile starts with the first profile step after countdown. The operation stops automatically after the last step.		To scale the profiles, activate OP11 (User Options). If scaling is performed, the max. parameters are displayed (see above).
Terminate the operation with “stop”.		

For possibilities to interfere with an automatic program, see “interfere with an automatic program”.

8.5 Cardio mode (optional)

- WARNING! Heart rate monitoring systems may be inaccurate.
- Incorrect or over exercising may result in serious injury or death.
- If you feel faint or dizzy stop exercising immediately and consult a medical doctor.
- Exclude overloading or overstressing of the subject.
- The automatic modes must only be performed on the prescription of the medical doctor.
- Operator and subject have to be aware of automatic load changes during profile, cardio and test mode.
- In case of any visible or assumed defects or malfunctions (of the device, accessories, software, etc.), unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.

Start and load changes within the automatic modes are indicated by acoustic signals (beeps).

Furthermore, the displays show the next load parameters (flashing).

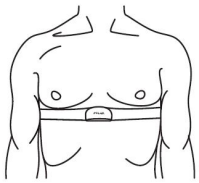
The cardio mode allows training within pre-defined heart rate limits.

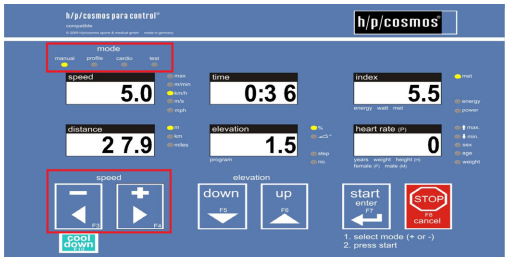
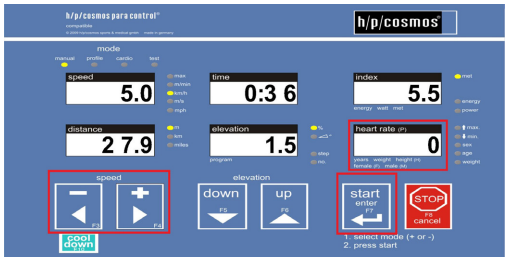
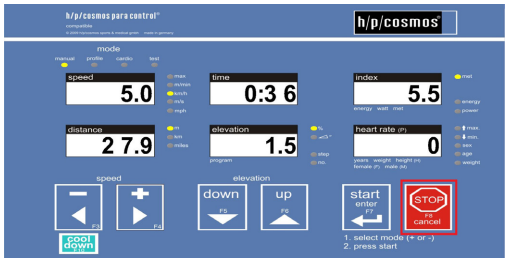
In order to stay within the limits, the treadmill adjusts speed and elevation automatically, first speed, then elevation.

A POLAR heart rate sensor detects the heart rate.

Moisten the contact areas of the POLAR heart rate sensor.

Place the transmitter directly under the pectoral muscle (see picture).



Basic functions	Buttons / displays	Further information
Select “cardio mode” with “+” or “-“ button Selected mode flashes. Confirm with “enter”.		Device must be in “mode selection” (one of the mode LEDs flashes) To get there, cancel all other activities by pressing the “stop”-button.
Set – max. speed, – age, – heart rate upper limit and – heart rate lower limit with “+” or “-“ Confirm each parameter with “enter”. The running belt starts automatically.		To avoid high speed, set a low max. speed. The treadmill will adjust the load via elevation. In order to avoid elevation, set a high max. speed. The treadmill will adjust the load via speed.
Terminate the operation with “stop”.		

If the heart rate signal totally fails, an acoustic warning signal occurs and the heart rate display shows no value any more. Furthermore, the device reduces speed and elevation to 0 within one minute.

For possibilities to interfere with an automatic program, see “interfere with an automatic program”.

The treadmill adjusts speed and elevation according to following matrices.

Deviation from lower limit	Speed (km/h)	Elevation (%)	Reaction time (s)
< 5 heart beats	0.2	0.1	25
6 … 15	0.4	0.2	25
16 … 30	0.6	0.4	25
31 … 50	0.8	0.8	20
> 50 heart beats	1.0	1.0	20

Deviation from lower limit	Speed (km/h)	Elevation (%)	Reaction time (s)
< 5 heart beats	0.3	0.3	12
6 … 15	0.8	0.8	12
16 … 30	1.0	1.0	10
31 … 50	1.5	1.2	8
> 50 heart beats	2.0	1.6	7

8.6 Test mode

- WARNING! Heart rate monitoring systems may be inaccurate.
- Incorrect or over exercising may result in serious injury or death.
- If you feel faint or dizzy stop exercising immediately and consult a medical doctor.
- Exclude overloading or overstressing of the subject.
- During stress tests a medical doctor has to be available at any time.
- The automatic modes must only be performed on the prescription of the medical doctor.
- Operator and subject have to be aware of automatic load changes during profile, cardio and test mode.
- In case of any visible or assumed defects or malfunctions (of the device, accessories, software, etc.), unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.

Start and load changes within the automatic modes are indicated by acoustic signals (beeps).

Furthermore, the displays show the next load parameters (flashing).

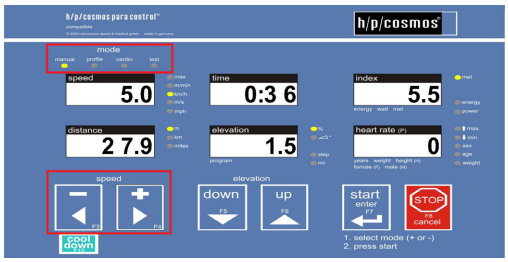
The h/p/cosmos treadmills are equipped with pre-defined tests.

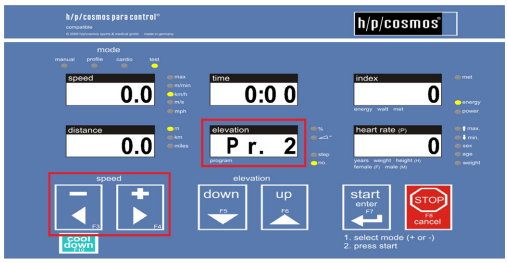
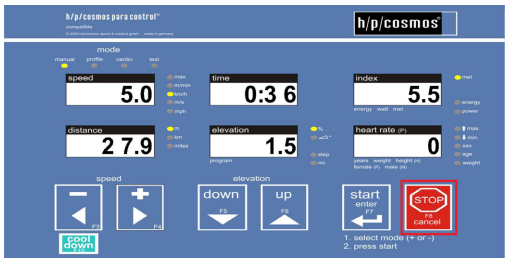
- As described before, the treadmill contains a number of standardized protocols.
  Nevertheless, the treadmill does not give recommendations for treatment.
  The decision about the correct load is the duty of the medical doctor.
  Depending on the application the load includes speed, elevation, distance, heart rate, body weight or motion support etc..

The annex covers a detailed explanation of all pre-defined tests (see “Annex II”).

The annex also covers a detailed explanation how to create a self-defined test.

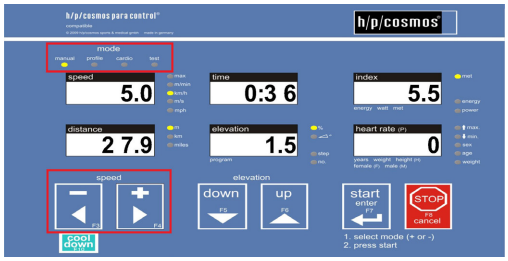
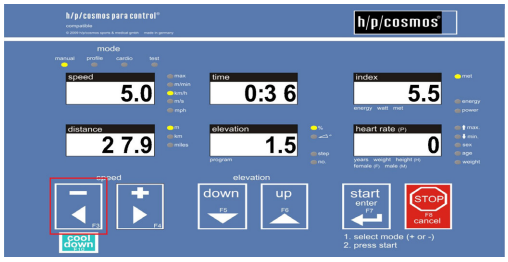
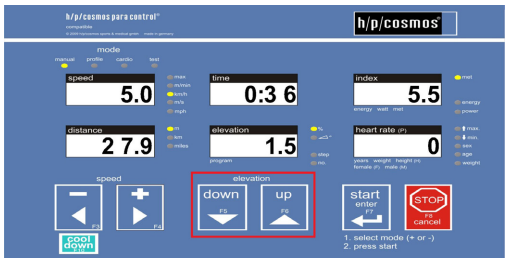
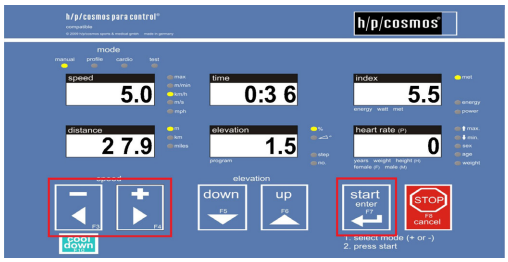
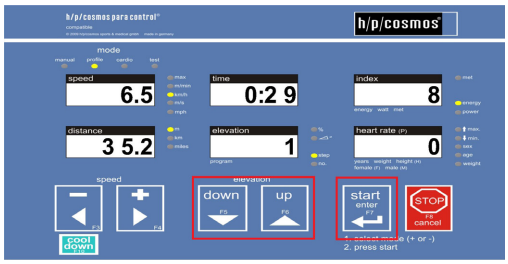
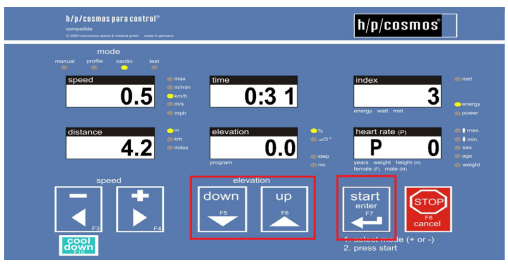
No.	Description	No.	Description
01	UKK walk test	07	Cooper protocol
02	Graded test	08	Ellestad A protocol
03	Conconi test	09	Ellestad B protocol
04	Bruce protocol	10	Ramp profile
05	Naughton protocol	11	Gardner test protocol
06	Balke protocol	21 – 28	Freely definable

Basic functions	Buttons / displays	Further information
Select “test mode” with “+” or “-“ button. Selected mode flashes. Confirm with “enter”.		Device must be in “mode selection” (one of the mode LEDs flashes) To get there, cancel all other activities by pressing the “stop”-button.

Basic functions	Buttons / displays	Further information
Select test with “+” or “-“ Confirm with “enter”. The running belt starts automatically after countdown.		Following tests require further settings: 01 UKK walk test 02 Graded test 03 Conconi test 10 Ramp profile
Terminate the operation with “stop”.		

For possibilities to interfere with an automatic program, see “interfere with an automatic program”.

8.7 Interfere with automatic program

Basic functions	Buttons / displays	Further information
Alter speed Press “+” or “-“.		Profile / test mode: Only valid for current step. Cardio mode: Reduce the speed with “-“ or exceed the max. speed with “+”; This sets a new max. speed
Decelerate to 0 km/h to pause the operation (see “pause function”).		
Alter elevation Press “up” or “down”.		Profile / test mode: Only valid for current step.
Switch between modes Press “enter” together with “+” or “-“.		Switch to automatic mode: Further settings are necessary to continue.
Profile or test mode: Switch between steps Press “enter” together with “up” or “down“.		
Cardio mode only: Change heart rate upper limit Press “enter” together with “up” or “down“.		Heart rate lower limit follows according to initial range.

8.8 Pause function

Reducing the speed with the “-“ key to 0.00 km/h, triggers the “pause” function.
The running belt stops.
The speed display shows “PAUS”.

Pressing the “start” key, starts the running belt at the preset starting speed (default: 0.5 km/h). All values are maintained.
Pressing the “+” key, starts the running belt at 0.1 km/h. All values are maintained.

Pressing the “stop” key one time, terminates the application. All values remain on the display for 2 minutes.
Pressing the “stop” key a second time, resets all values.

8.9 Acceleration levels

Start the use of the treadmill with slow walking, especially for beginners.

There are seven acceleration / deceleration levels for any kind of operation.

The acceleration levels are defined by the time it takes to accelerate from 0 km/h to maximum speed.

Example: With acceleration level 3, it takes 33 seconds from 0 km/h to maximum speed (see table below).

In order to access a certain acceleration level press the "+" or "-" button several times, then hold it.

The number of times the button is pressed before holding defines the acceleration level.

Example: Pressing "+" 3 times, then holding "+" results in an acceleration with acceleration level 3.

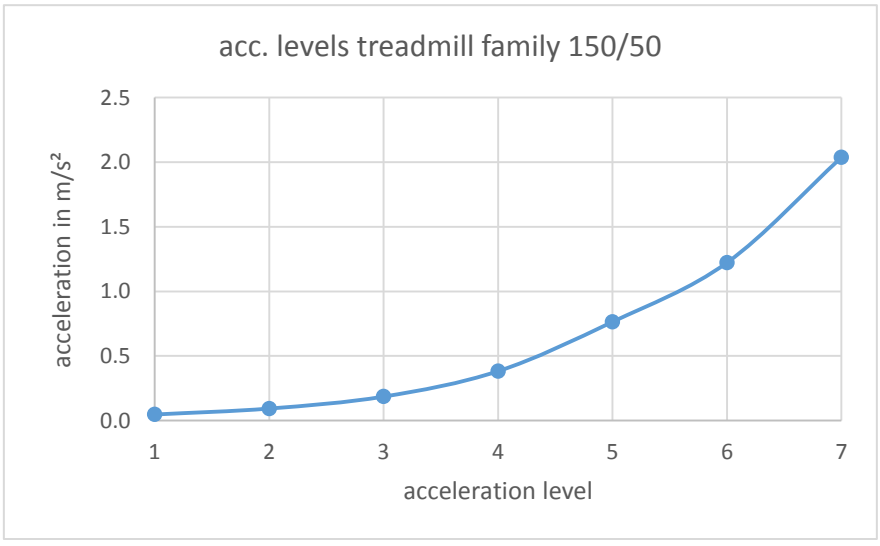
Acceleration levels 1 - 4 are freely accessible.

Acceleration levels 5 - 7 are locked by the administrator options. For access, please contact our service department.

The high acceleration of the levels 5 - 7 is dangerous for untrained subjects and must only be applied during sports medicine and athletic use.

In order to limit the accessibility of the acceleration levels, see OP 27 - 29 of the "User Options".

Acc. level	0 to max in s	Acc. in m/s²
1	131	0.047
2	66	0.093
3	33	0.185
4	16	0.382
5	8	0.764
6	5	1.222
7	3	2.037



8.10 User Options

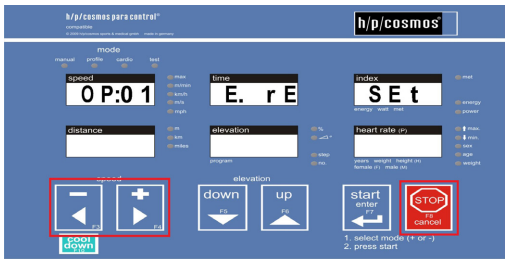
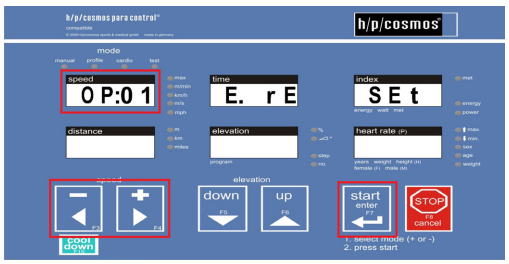
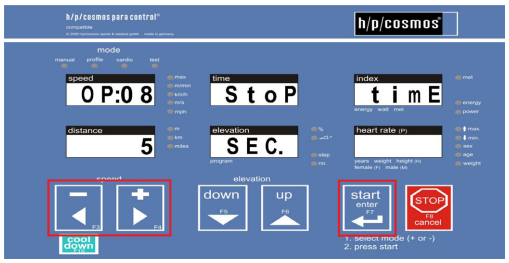
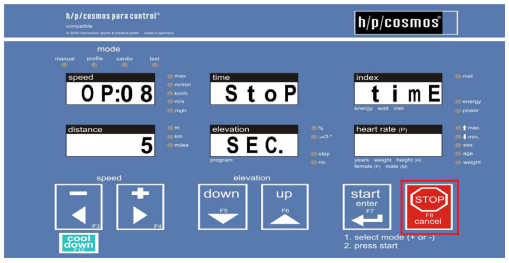
Basic functions	Buttons / displays	Further information
Press “+”, “-“ and “stop” together for at least 3 s.		“speed “ display shows “OP 01”.
Select option with “+” or “-“ Confirm with “enter”.		
Adjust option with “+”or “-”. Confirm with “enter”.		
Leave options by pressing “cancel”.		

Table of User Options (details see chapter 17.4 “User Options (details)”)

No.	function	Adjustable range (default setting)
OP 01	Reset error messages.	
OP 02	Total distance (km)	Report only
OP 03	Total time (h), operation + stand-by	Report only
OP 04	Total time (h), operation only	Report only
OP 05	Firmware version	Report only
OP 06	Real time clock	Setting of current date/time
OP 07	Acoustic heart rate signal	**OFF** or ON
OP 08	Deceleration time	2 ... 30 s **(5s)**
OP 09	Starting speed (manual and cardio mode)	0.1 km/h ... 5.0 km/h **(0.5 km/h)**
OP 11	Scaling of profile mode	**0 (off)** 1 all parameters together 2 each parameter separately
OP 12	Unit for displaying speed	**0 = x.x km/h**, 1 = x.x m/s, 2 = x.x mph, 3 = x m/min 20 = x.xx km/h, 21 = x.xx m/s, 22 = x.xx mph, 23 = x.x m/min
OP 13	Unit for displaying distance	0: km;1: miles; **2: m**
OP 14	Unit for angle of elevation	**0 = %** / 1 = ° (degrees)
OP 15	Default body weight	10 ... 250 kg **(65 kg)**
OP 16	Bodyweight request	OFF / ON
OP 17	Unit of energy consumption	**JOUL = kJoule**, CALO = kcal
OP 18	Max. speed (default) in cardio mode	0.0 ... max. speed (6.0 km/h)
OP19	Setting of polar W:I:N:D system	**0000 0000 all senders accepted** xxxx xxxx only specific sender accepted 9999 9999 next sender will be accepted
OP 20	RS 232 interface protocol: COM 1	OFF, 1 … 20 **(1 = h/p/cosmos coscom)**
OP 21	RS 232 interface protocol: COM 2	OFF, 1 ... 18 **(1 = h/p/cosmos coscom)**
OP 23	RS 232 interface protocol: COM 4	OFF, 18 … 23 **(20 = h/p/cosmos coscom v3)**
OP 27	Min. acceleration and deceleration level	**1** ... 5
OP 28	Max. acceleration and deceleration level	1 ... **7** (4)
OP 29	Acceleration and deceleration level via RS232	1 ... **5** (4)
OP 40	Locking and unlocking the treadmill	OFF = locked, **ON = unlocked**
OP 41	Locking and unlocking the manual mode	OFF = locked, **ON = unlocked**
OP 42	Locking and unlocking the profile mode	0 (all locked) ... **6 (all unlocked)**
OP 43	Locking and unlocking the cardio mode	**OFF = locked**, ON = unlocked
OP 44	Locking and unlocking the test mode	0 ... 94 **(28, unlocked up to test 28)**
OP 45	Report mode display „index“	**0 (display alternates)** 1 (MET), 2 (kJ), 3 (Watt) cannot be stored beyond restart
OP 46	Report mode display „elevation“	**0 (display alternates)** 1 (elevation), 2 (step) Cannot be stored beyond restart
OP 47	Sustain values in display resp. automatic „Reset“	**OFF = RESET with 1 x STOP** ON= RESET with 2 x STOP
OP 48	Countdown of program-step	**OFF = count-up**, ON = countdown
OP 52	Output interval for printer protocol	0 = no individual values, 1 ... 100 s **(60 s)**
OP 53	Language settings for printer protocol	**English**, German, French, Spanish, Portuguese, Hungarian

9 Accessories / compatible devices

- Do not modify the device, configurations, accessories or software in any way.
- Do not connect any devices, accessories or software, not listed in “accessories / compatible devices”.

Read and obey all instructions for use of all accessories and compatible devices.

The list of accessories / compatible devices may vary.

Therefore always refer to the most recent version of these instructions for use, available at www.h-p-cosmos.com.

9.1 Creating Systems

The person combining a medical device with any other device for the first time becomes manufacturer of a Medical Electrical System (ME-System acc. to IEC 60601-1, 16).

Depending on the combination, this system might even be a Programmable Electrical Medical System (PEMS acc. to IEC 60601-1, 14).

It is obligatory to perform a risk management when creating an ME-System / PEMS.

Risk management, safety, compliance, and maintenance are the responsibility of the manufacturer of the ME-system / PEMS, not the responsibility of h/p/cosmos.

For all ME-Systems / PEMS a potential equalization must be provided.

Furthermore, the person who puts devices bearing the CE marking together, must meet the corresponding requirements, stated in the European Medical Device Directive (MDD 93/42/EEC, Article 12).

9.2 Overview of accessories

Following accessories are available for this device:

(For illustrations and detailed descriptions, see annex or www.h-p-cosmos.com.)

Article number	Accessory	Purpose	Information
cos10079	h/p/cosmos safety arch	Fall prevention and safety stop	Mandatory (*)
cos10071-v4.1.0	Para control PC software	Remote control software	Included
cos00097010034	Interface connection cable RS 232 5m	Connection	Included
cos10223	Potential equalization cable	Potential equalization	Optional
cos00097010035	Interface connection cable RS 232 10m	Connection	Optional
cos12769-01	USB-RS232 converter	Connection	Optional
cos00098010025	COM 2 interface RS232	Connection	Optional
cos16487	COM 3 interface RS232	Connection	Optional
cos16488	COM 4 interface RS232	Connection	Optional
cos10145	Handrail, long 2 pillars	Body weight support	Optional
cos102010	h/p/cosmos handrail adjustable 150/50	Body weight support	Optional
cos16571-01	Cross-bar front rail	Body weight support	Optional
cos16186-02	Wheelchair ramp	Wheelchair access	Optional
cos100106	POLAR heart rate receiver board WIND	Heart rate measurement	Optional
cos102818	Heart rate measurment Polar & control	Heart rate measurement	Optional
cos12013	Arm support adjustable in height and width	Body weight support	Optional
cos100680	Additional keyboard for arm support	Remote control	Optional
cos12922	Extension cord 2m additional keyboard	Remote control	Optional
cos10111-01	Keyboard holder for arm support	Remote control	Optional
cos14135	Holder f. optional keyboard o. handrail 60	Remote control	Optional
cos10107	Optional stop button in right arm support	Emergency stop	Optional

Article number	Accessory	Purpose	Information
cos10108	Optional stop button in left arm support	Emergency stop	Optional
cos100548	Emergency stop button magnet holder 10m	Emergency stop	Optional
cos15294	Emergency stop ext. without fixation 5m	Emergency stop	Optional
cos15294L10m	Emergency stop ext. without fixation 10m	Emergency stop	Optional
cos15294 L15m	Emergency stop ext. without fixation 15m	Emergency stop	Optional
cos15933	Emergency stop-button magnet holder 5m	Emergency stop	Optional
cos12410	Drink-bottle holder	Drinking bottle	Optional
cos15485	Drink-bottle	Drinking bottle	Optional
cos30022	Robowalk expander F	Motion support / resistance	Optional
cos30023	Robowalk expander B	Motion support / resistance	Optional
cos101277	Science port speed output TTL	Measurement	Optional
cos14376	Sensor f speed & distance measurem. 150-50	Measurement	Optional
cos14005	Floor protection mat treadmill 150/50	Floor protection, stability	Optional
cos12607-00	Base plate 150/50 for h/p/cosmos airwalk	Floor protection, stability	Optional
cos100755c	Fixing disc leveling socket 150/50 set	Floor protection, stability	Optional
cos00098100045-02	reversing treadmill belt rotation 150/50	Downhill running / walking	Optional

(*) At least one kind of fall prevention is mandatory, see “safety”.

9.3 Compatible devices

A number of ECG and CPET (cardiopulmonary exercise test) devices as well as software products are compatible with h/p/cosmos treadmills via coscom v3 interface protocol.

Please contact service@h-p-cosmos.com for the list of compatible devices.

The risk management of this device covers the influence of the compatible devices on this device.

The risk management of this device does not cover the influence of this device on the compatible devices.

Make sure, this device is listed as compatible device in the instructions for use of the compatible device.

10 Disinfection / Cleaning

- Disinfect the device before and after every treatment.
- Disconnect the device and all accessories from mains power supply before cleaning or disinfection.

Description	Illustration
Disinfection − Unplug the device. − Apply some disinfectant to a cloth. − Wipe all surfaces the subject might have touched. − Wipe all surfaces that may have come into contact with body fluids. − Wipe the safety harness. h/p/cosmos recommends Bacillol plus, order number [cos12179].	
Clean the device regularly − Unplug the device. − Use a damp cloth (not wet). − Wipe all surfaces. − Wash safety harness acc. to label.	

The h/p/cosmos devices are neither sterile nor can they be sterilized.

11 Maintenance

- Obey the maintenance intervals claimed in chapter “maintenance”.
- Obey the competences claimed in chapter “maintenance”.
- A second person has to be present during maintenance.
- In case of any visible or assumed defects or malfunctions (of the device, accessories, software, etc.), unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.
- In case of any visible or assumed wear and tear (of the device, accessories, labels, etc.), unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.
- In case of any fluid entering into the device, unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.

Do not perform maintenance during use.

Proper maintenance is an important pre-condition for safety, reliability, function and accuracy of the device.

Support h/p/cosmos service personnel with the documents needed.

11.1 Intervals and competences

Maintenance	Interval	Competence
Daily inspection	Daily	Operator
Lubrication	When OIL message occurs	Operator
Adjustment of running belt	If due	Operator
Safety inspection	12 months	h/p/cosmos service personnel only
Change of safety arch rope	24 months	h/p/cosmos service personnel only
Tightening of the running belt	If due	h/p/cosmos service personnel only
Adjustment of levelling sockets	If due	h/p/cosmos service personnel only
Installation and repair work	If due	h/p/cosmos service personnel only

h/p/cosmos recommends entering into a service contract with an authorized h/p/cosmos service technician.

A service contract provides the best preventive maintenance and care for the device.

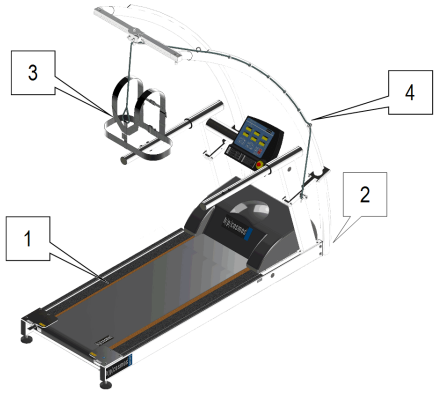
The service contract is available at service@h-p-cosmos.com.

To receive information on becoming h/p/cosmos service personnel, please contact service@h-p-cosmos.com.

11.2 Daily inspection

- Perform a daily visual inspection (see chapter “maintenance”).

Before daily use, check the whole device for wear and tear.

Description	Illustration
Pay special attention to components with high probability of wear and tear: 1. Running belt and non-slip surfaces 2. External cabling 3. All textile parts 4. Fall prevention incl. safety harness, buckle, carabiner, rope and rope arrest If there is any visible or assumed wear and tear, unplug device, exclude reconnection and call h/p/cosmos service personnel.	

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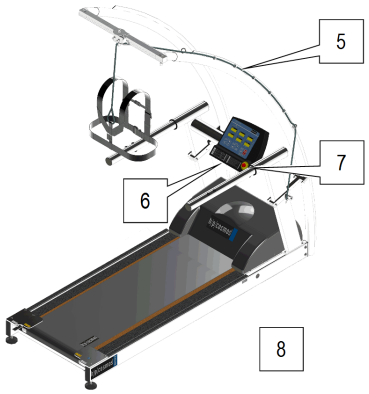
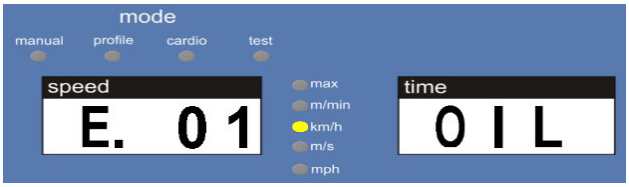
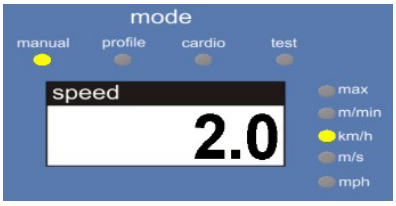
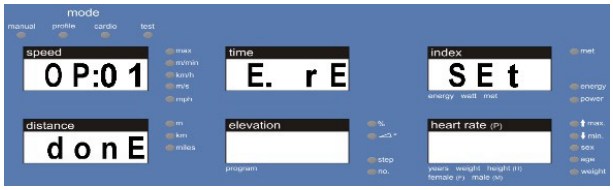
Description	Illustration
Perform a functional check of all safety equipment: 5. Fall prevention 6. Pull cord safety stop 7. Emergency off button on UserTerminal 8. Further safety equipment If there is any visible or assumed defects or malfunctions, unplug device, exclude reconnection and call h/p/cosmos service personnel.	

11.3 Lubrication

Description	Illustration
When OIL message occurs, check the oil film on the running belt. Do the same if there are dry grinding noises during operation. The OIL messages occurs every 1000 km by default. The oil interval may be varied, depending on environmental conditions and use.	
Unplug the treadmill.	
Move one hand / tissue for 1 m through the center between running belt and running deck. A slight film of oil must remain on the hand. If the running belt is too dry, it must be lubricated. For further and precise analysis a detailed instructions regarding the tissue lubrication test are available at service@h-p-cosmos.com.	
Fill the syringe with 10 ml of the lubricant (h/p/cosmos special oil, only). Pump the lubricant under the running belt very slowly and remove the syringe.	

Description	Illustration
Start the running belt with 2 km/h and walk on the belt for 2 min. Vary the position in order to distribute the lubricant.	
Reset the OIL message (see OP01 in “User options”).	

11.4 Adjustment of running belt

- Unmeant trapping hazards: Take off ties, scarfs or other clothes that may be trapped. Secure long hair and ribbons during maintenance and training in order to prevent being captured in trapping zones.
- Do not touch the running belt while it is in motion.
- A second person has to be present during maintenance.

Description	Illustration
The maximum allowed lateral position of the running belt is marked with this label.	
Operate the device at 10 km/h. Turn the LEFT trimming screw very slowly (¼ rotation – observe – ¼ rotation – observe…). Turn clockwise to adjust belt to the right. Turn counter-clockwise to adjust belt to the left.	
After adjustment, observe the running belt at 10 km/h for at least 2 min. Belt must maintain the position. Remove Allen key from screw.	

11.5 Issues for qualified service personnel

All maintenance work that is not explained in detail, must not be performed by the operator.
Safety inspections, installation and repair work, must also not be performed by the operator.
This kind of work must be performed by h/p/cosmos service personnel according to the “h/p/cosmos service instructions”.
The “h/p/cosmos service instructions” are available at service@h-p-cosmos.com.

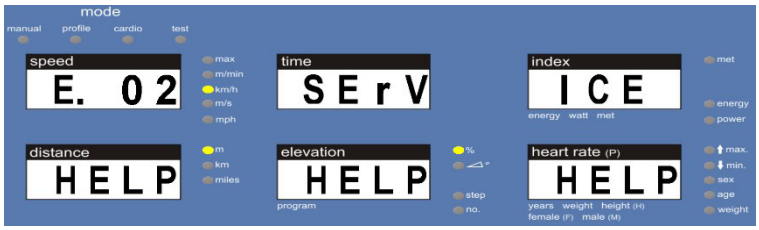
11.6 Safety inspection

In order to maintain the safety of the device, h/p/cosmos prescribes performance of an annual safety inspection.
Refer to the date on the inspection sticker on your device for the next inspection date.

h/p/cosmos bases the annual safety inspection on German laws and regulations.
It is the operator’s responsibility to comply with national laws and regulations.

The inspection label on the device also certifies the optional equipment and the accessories.
However, inspection intervals for optional equipment and accessories may deviate.

After 12 months or 5000 km there will be a safety inspection reminder (see below).



The error message will be reset by the h/p/cosmos service personnel performing the safety inspection.

11.7 Spare parts and consumables

Spare parts must only be replaced by qualified h/p/cosmos service personnel.
Information about spare parts is available at service@h-p-cosmos.com.
A list of consumables is included in the accompanying documents.

12 Troubleshooting

12.1 General troubleshooting

- In case of any visible or assumed defects or malfunctions (of the device, accessories, software, etc.), unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.
- In case of any visible or assumed wear and tear (of the device, accessories, labels, etc.), unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.

Problem	Solution
Device cannot be switched on	Release emergency off (see “emergency off”) Check power supply connection Check device protection switch Check power socket (test with another device)
Elevation does not work (E21)	Switch off Wait 10 min (in order to cool down) Switch on again In case E21 still appears, unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.
Device does not start but displays speed value	Switch off and on again Check error messages (see below)
Oil leakage	Unplug device Remove excess oil besides running belt Remove excess oil under running belt Check the next days and repeat if necessary.
Device indicates “pull stop”	Release emergency stops (see “emergency stop”)
Electrostatic discharge	Choose proper floor, clothing and humidity
Bouncing noise	Device may not stand firmly Contact service@h-p-cosmos.com
Grinding noises	Check lubrication (see “lubrication”) Check adjustment of running belt (see “adjustment of running belt”)
Running belt outside of lateral limits	See “adjustment of running belt”
Problems with optional heart rate measurement	See “Annex III (Accessories)”
Any other problem	unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.

12.2 RS232 troubleshooting

Problem	Solution
No connection via RS232 (wrong cable)	For connection to PC with h/p/cosmos software and most external devices use the included RS 232 interface connection cable [cos00097010034].
No connection via RS232 (cable defect)	Check cable and plugs for defects. Replace defective cable.
No connection via RS232 (wrong COM port)	Do not use COM 3 on the device (see “connection of external devices / interfaces”).
No connection via RS232 (wrong settings)	Choose correct interface protocol on device (“User Options” OP 20 or 21). Choose correct interface protocol on periphery. Check installation of peripheral software.
No connection via RS232 (blocked COM port)	Restart peripheral software. Restart peripheral device.
Acceleration via external device too slow.	Check max. acceleration and deceleration level via RS232 (“User Options” OP 29).
Any other problem	unplug device, exclude reconnection, mark clearly and inform h/p/cosmos service personnel via telephone and writing.

12.3 Error messages

Following error messages may be displayed on the UserTerminal:

Error code	Acoustic code (x = short beep, o = long beep)	Error message	Action
E01	ooooo xoooo	Oil Help	See “lubrication”
E02	ooooo xxooo	Service Help	See “safety inspection”
E20	xxooo ooooo	Elev Help	Unplug device, exclude reconnection and contact service@h-p-cosmos.com
E21	xxooo xoooo	Incr Help	
E30	xxxoo ooooo	Setup Help	
E31	xxxoo xoooo	Setup Help	
E32	xxxoo xxooo	Setup Help	
E41	xxxxo xoooo	Setup Help	
E50	xxxxx ooooo	FU Help	
E51	xxxxx xoooo	FU Help	
E52	xxxxx xxooo	FU Help	

13 Technical data

13.1 UserTerminal

Description	Data		
	stratos	mercury	locomotion
Displays	6 seven-segment LCD displays, LED displays of mode and unit		Touchscreen
Keyboard	6-key keyboard film		Touchscreen

“It” / “E” devices have no UserTerminal (no display, no keyboard). Control via interface

13.2 Dimensions

Description	Data		
	stratos	mercury	locomotion
Device dimensions (L x W x H)	2100 x 950 x 1370 mm (incl. UserTerminal)		2100 x 1350 x 1370 mm (incl. seats)
Running surface dimensions (L x W)	1500 x 500 mm		
Track access height	180 mm		
Handrail dimensions	D = 60 mm		D = 40 mm

Data may be influenced by accessories.

13.3 Loads

Description	Data		
	stratos	mercury	locomotion
Max. patient weight *	300 kg		300 kg
Device weight	220 kg		365 kg
Substitutional load to floor (EN 1991)	3.1 kN / m²		4.0 kN / m²
Load on each support (wheels + feet)	1.3 kN		1.7 kN

Data may be influenced by accessories.

13.4 Emissions

Description	Data
A-weighted emission sound pressure level at the trainer’s ear (EN 957-6)	LpA <70 dB A (50 dB) (Noise emission under load is higher than without load.)

13.5 Essential performance characteristics

Description	Data		
	stratos	mercury	locomotion
Speed	0.0 … 22.0 km/h	0.0 … 22.0 km/h	0.0 … 10.0 km/h
Min. speed increment	0.1 km/h		
Speed accuracy *	± 5 % (above 2 km/h), ± 0.1 km/h (up to 2 km/h)		
Elevation	No elevation	0.0 ... 25.0 %	
Min. elevation increment		0.1 %	
Elevation accuracy *		± 5 % (above 2 % elevation)	

13.6 Environmental conditions

Operation	Data
Temperature	+10 … +40° C
Humidity	30 … 70%, without condensation
Pressure	700 … 1060 hPa
Altitude	max. 3000 m, without pressurization (altitudes >1000m can cause minor loss of performance)
Oxygen saturation	<= 25%
Central lubrication system	manual

Exclude danger of explosions or inflammability. Exclude high voltage lines / devices in near vicinity.

Transport & Storage	Data
Temperature	-25°C … +40°C
Humidity	0 … 95%, without condensation
Pressure	700 … 1060 hPa
Altitude	max. 3000 m, without pressurization

When storing for more than 6 months without power connection, the batteries of the MCU may discharge.
Please contact service@h-p-cosmos.com in case of re-installation after storage.

13.7 Technical and legal requirements

Description	Data
Stationary training equipment	ISO 20957-1, EN 957-6
Medical electrical equipment	IEC 60601-1
Electromagnetic compatibility	IEC 60601-1-2
Usability	IEC 60601-1-6, IEC 62366-1
Software	IEC 62304
Medical device directive	MDD 93/42/EEC
Machinery directive	MD 2006/42/EC
Legal requirements	German medical device act (MPG)

13.8 EMC tests

Description	Data
Measurement of conducted emission	EN 55011, Group 1, Class B
Measurement of radiated emission	EN 55011, Group 1, Class B
Testing of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems	EN 61000-3-3
Electrostatic discharge immunity test	EN 61000-4-2
Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3
Electrical fast transient immunity test	EN 61000-4-4
Surge immunity test	EN 61000-4-5
Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6

13.9 Classification

Description		Data
MDD 93/42/EEC	Notified body	CE 0123
MDD 93/42/EEC	Risk class	IIb active therapeutic device and active diagnostic device
60601-1	Protection against electric shock	Class I, ⏚
IEC 60601-1	Protection against harmful ingress of water or particulate matter	IP20
IEC 60601-1	Mode of operation	Continuous operation with intermittent loading
IEC 60601-1	Overvoltage category	II (2500 Vpeak mains transient voltage)
IEC 60601-1	Applied part	Type B (whole device)
IEC 60601-1	Pollution degree	Degree 2
ISO 20957-1	Usage class	S (Studio): professional and / commercial use I (inclusive): professional and/or commercial use provided for inclusive use for people with special needs
EN 957-6	Accuracy class	A
IEC 62304	Risk class	B

13.10 Certificates

Description	Data
MDD 93/42/EEC	CE declaration of conformity
MDD 93/42/EEC	EC certificate, quality assurance
MDD 93/42/EEC	Free sales certificate
EN ISO 13485	Certificate, quality management medical devices
IEC 60601-1	CB certificate
UL 60601-1	NRTL certificate

Certificates see accompanying documents and
https://www.h-p-cosmos.com/en/contact-support/media-downloads/certificates

13.11 Interfaces (RS232, D-SUB, 9-pole)

Description	Data		
	stratos	mercury	locomotion
COM 1 (standard)	standard	standard	standard
COM 2 (optional)	optional	optional	standard
COM 3 (service)	service	service	service
COM 4 (optional)	optional	optional	n/a (polar)

13.12 Voltage, Current, Performance

Description	Data		
	stratos	mercury	locomotion
Input voltage *	230 V ~ (f: 50 / 60 Hz)		
Current input (long time) *	6.5 A		
Current input (momentary) *	14.8 A		
Energy consumption (long time)	≤ 1500 VA		
Energy consumption (momentary)	≤ 3400 VA		
Energy efficiency	N/A		
Device protection switch (circuit breaker)	16 A		
Drive motor capacity	3300 W		
Elevation motor capacity	No elevation	390 W	
Earth leakage current	≤ 0.2 mA		
Isolation transformer	2000 VA		
Power supply cord	not detachable, 5 m		

13.13 Software, Programmes

Description	Data		
	stratos	mercury	locomotion
h/p/cosmos para control®	included		
h/p/cosmos para graphics®	optional		
h/p/cosmos para analysis®	optional		
h/p/cosmos para motion®	optional		
Number of stored programmes	6 training profiles,10 test profile, 8 user definable profiles		

13.14 All-pole disconnection

There are the following options for all-pole disconnection:

- Unplug device from power socket.
- Switch off device protection switch

Regard free area in order to maintain access to cables and circuit breaker (see “position of subject and operator”).

* Overload or weak power supply may lead to reduced speed accuracy or tripping the fuse.

Subject to technical alterations without prior notice. E & OE (errors and omissions excepted).

14 Liability and Warranty

Following will cause loss of liability and warranty and may result in serious injury or death or damage to the device:

- Use other than explicitly mentioned as intended use
- Unauthorized maintenance or lack of maintenance, safety checks or repairs
- Unauthorized modifications or extensions
- Unauthorized installation, commissioning or instruction
- Use of any unauthorized or non-original h/p/cosmos parts, spare parts, consumables, sensors or detectors
- Disregard of safety information (danger, warning and caution statements)
- Any modifications to the device, software, configurations and accessories
- Connection of accessories, software or devices, not listed in “accessories / compatible devices”

The “safety information – forbidden use” list does not claim to be exhaustive and may be extended during market phase (post market surveillance). The latest version of these instructions for use is always available at: www.h-p-cosmos.com

Limited liabilities apply:

If h/p/cosmos or h/p/cosmos organizational bodies, senior management or agents can be held accountable for the payment of damages pertaining to slight negligence (breach of material contractual obligations), the damages shall be limited to damages that could typically have been foreseen. Liability pertaining to slight negligence excludes liability as a result of loss of production, interruption of business and loss of profits.

Further details see website: www.h-p-cosmos.com/en/gtcb.

15 Expected Lifetime

- Obey the maintenance intervals claimed in chapter “maintenance”.
- Obey the competences claimed in chapter “maintenance”.

The expected lifetime of the entire device is 20 years, provided, that

- all maintenance intervals are maintained.
- wear and tear parts are replaced by h/p/cosmos service personnel during annual maintenance.

16 Disposal

Dispose the device according to European directive 2012/19/EU and the corresponding local disposal law.

Dispose the lubrication material according to the corresponding local disposal law.

Contact service@h-p-cosmos.com to receive further information or an offer regarding correct disposal by the manufacturer.

17 Annex I

17.1 Installation

This device must only be unpacked, transported and installed by h/p/cosmos service personnel (see maintenance).
If the packaging has been damaged, please contact service@h-p-cosmos.com immediately.

It is the customer's responsibility to ensure the following conditions before the installation:

- There must be a separate power circuit for the device (dedicated line).
- There must be a separate wall socket for the device (electrically interlocked with circuit breaker 16A, type C).
- The wall socket has to be marked with the serial number of the device.
- The wall socket has to be accessible at all times.
- The intended location must meet the environmental conditions (see "technical data").
- The intended location must be capable of bearing the load of the device (see "technical data").
- The intended location must provide the safety area and free area as stated in "position of subject and operator".
- The intended location must provide a ceiling height, high enough for device + accessories (fall prevention).
- The intended location must provide a stable and levelled base in order to prevent noise or bouncing.
- The intended location must maintain the local requirements for electrical installation.
- The intended location must provide a suitable protective earth condition (e.g. PE-bolt).
- The intended location must provide the requirements for electrical installation acc. to "technical data".

The manufacturer does not assume liability for any damage, complaints or missing parts that are not reported immediately upon delivery on the packing list/delivery note.

17.2 Instruction protocol

When installing the device, the h/p/cosmos service personnel instructs the intended operator according to the instructions for use, following this instruction protocol.

With the name and signature on the instruction protocol, the instructed persons confirm that they fully know how to operate the device safely. The instructed persons confirm they are able to instruct further operators according to this protocol.

No.	Information	Chapter	Check
1.	These instructions for use are available as print version at service@h-p-cosmos.com.	-	
2.	The instructions for use are to be read in full before starting with the operation.	-	
3.	The safety information is explained in detail.	Safety	
4.	The safety information must be displayed within sight of the device.	Safety	
5.	The function of all safety equipment is explained in detail.	Safety	
6.	The use of the fall prevention is explained in detail.	Safety	
7.	The position of subject and operator is explained.	Position of S+O	
8.	The safety area (2 m behind device) is specifically pointed out especially.	Position of S+O	
9.	The function of the UserTerminal is explained in detail.	UserTerminal	
10.	The general use is explained (incl. manual, profile, cardio and test mode).	Operation	
11.	The competences and intervals for maintenance are explained.	Maintenance	
12.	The adjustment of the running belt is explained in detail.	Maintenance	
13.	The lubrication of the device is explained in detail.	Maintenance	
14.	The accompanying documents are explained and handed over.	-	

17.3 Instruction protocol, signatures

By signing this protocol, the authorized h/p/cosmos service personnel and the customer confirm the receipt and understanding of all safety information, the performed instruction and commissioning according to the instruction protocol [cos15228-03]. The customer confirms the receipt of the listed devices including all accessories and options according to the h/p/cosmos delivery note. Disregard of safety information, intended or forbidden use, as well as unauthorized maintenance or lack of maintenance and regular safety checks may lead to injury or even death and can damage the device. Furthermore, this will result in loss of liability and warranty. Please fill out the instruction protocol and send it back to h/p/cosmos by fax (+49 18 05 16 76 69), email (sales@h-p-cosmos.com) or mail.

h/p/cosmos sports & medical gmbh Am Sportplatz 8 DE-83365 Nussdorf-Traunstein Germany	customer´s stamp / address:

h/p/cosmos device, model name	device serial number

instructor	name in clear block letters	h/p/cosmos dealer / technician	date and signature

instructed persons (customer, operator, etc.)	name in clear block letters	h/p/cosmos dealer / technician	date and signature

17.4 User Options (details)

Option	Description	Comment / Display
OP01	Reset (delete) error messages	The required maintenance work must be performed before deleting error messages. The h/p/cosmos service department must be contacted before one of the service displays or error codes is deleted!
	Note: This option exclusively resets the causing variable. If, for example, the E.02 service-time-interval is being reset with this operation, the distance-interval is not reset and vice versa. Only administrator option OP 47 resets all three values simultaneously.	Confirmation on display [DISTANCE] indicating "donE" Info: This option only resets the error message. If the error still exists, you are not able to reset the error message. In this case consult an authorized service engineer The following intervals are reset by this operation: E.01: Oil-interval A-OP 35 E.02: Service-time-interval A-OP 37 E.02: Service-distance-interval A-OP 38
OP02	Total distance covered (km)	[DISTANCE] and [ELEVATION] indicates: Total distance covered in km [HEART RATE] indicates km
OP03	Indication of total hours of operation = stand-by-time including runtime of motor/ running belt (h)	[DISTANCE] and [ELEVATION] show: Operation hours [HEART RATE] reports: h
OP04	Indication of total hours of runtime of motor/running belt (h)	[DISTANCE] and [ELEVATION] report: Operation hours [HEART RATE] shows: h
OP05	Indication of firmware version and date	[SPEED] reports “OP05” [TIME] reports “typE” [INDEX] indicates device type, e.g. “1.4” [DISTANCE] indicates: „MCU 5“ [ELEVATION] reports version, e.g. “1.01.1” [HEART RATE] reports default type, e.g. 1.3
OP06	Adjustment of actual date and the real time clock	[TIME] shows: rtc for Real Time Clock [ELEVATION] reports flashing: Date / time, year, month, date, hours, minutes, seconds
OP07	Acoustic heart rate signal	This function is normally used to control the regularity of the heart rate or to find reasons for transmitting problems [DISTANCE] indicates: OFF or ON OFF: No acoustic heart-rate-signal ON: Acoustic heart rate signal for every beat
OP08	Stop time / deceleration time after STOP key in relation to the max. speed	[DISTANCE] indicates: Stop time in sec. [ELEVATION] indicates: sec for seconds Adjustable from 2.... 30 seconds
OP09	Start speed (manual mode or cardio mode) for feedback after START key has been pressed. This value can be reduced to 0.0 km/h for advanced users.	[SPEED] indicates: start speed in km/h ⊙ max flashing ⊙ set unit is flashing Adjustable from 0.0 km/h ... 5.0 km/h

Option	Description	Comment / Display
OP11	Scaling of the profiles in profile mode (not for test mode)	DISTANCE shows: Scaling possibilities 0: No scaling (standard) 1: Scaling 1...6, which is shown in the profile mode on the INDEX display, refers to all parameters together (speed, elevation, time) 2: Scaling 1...6 refers to each parameter individually (speed, elevation, time)
OP12	Unit for display of speed	SPEED indicates: Unit of speed ... without decimal place: 3 = m/min ... with one decimal place: 0 = km/h 1 = m/s 2 = mph 23 = m/min ... with two decimal places: 20 = km/h 21 = m/s 22 = mph ⊙ km/h, m/s, mph or m/min flashes
OP13	Unit for display of distance	DISTANCE indicates: Unit of distance 0 = km 1 = miles 2 = m ⊙ m, km, or miles flashes
OP14	Unit for angle of elevation	ELEVATION indicates: Unit of elevation 0 = % (per cent) 1 = ° (degree) ⊙ % or ° flashes
OP15	Subject's body weight (default value)	DISTANCE indicates: 10 ... 250 (estimated weight) ⊙ weight flashes The personal body weight is necessary for a more correct calculation (estimation) of power and energy consumption.
OP16	Request for body weight before manual or automatic start	0 = OFF. 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 = ON. Input of body weight before starting a program is required. Calculation of energy consumption and power is based on the entered body weight.
OP17	Unit for energy consumption	JOUL = kJoule is the unit of energy consumption CALO = kcal is the unit of energy consumption
OP18	Maximum speed in cardio mode (default value) (this option is only available for treadmill-ergometers, not for ladder-ergometers)	SPEED reports: 0.0 ... max for the default value for maximum speed in the cardio mode. ⊙ adjusted unit flashes, ⊙ max. flashes The value of max. speed in cardio mode can be changed online by pressing + ▶ - ◀
OP19	Setting of sender for POLAR W.I.N.D. system	0000 0000 = all senders are accepted (can also be set with UP and DOWN) xxxx xxxx = only specific sender with special ID is accepted, must be set with + ▶ and - ◀ 9999 9999 = next sender will be accepted, saved and filtered (can also be set with UP and DOWN) (further settings in user OP23 and administrator OP16 are necessary)

Option	Description	Comment / Display
OP20	RS232 interface protocol: COM 1 Do not connect any devices, accessories or software, not listed in “accessories / compatible devices”.	DISTANCE indicates flashing: number of the RS232 interface protocol ELEVATION and HEART RATE reports: OFF = RS232 not active / no protocol / interface deactivated 1 = h/p/cosmos coscom v1, v2, v3 with baud rate 9600 bps (standard setting COM 1 and COM 2) 3 = printer protocol (serial printer or converter required) 7 = TM treadmill emulation in km/h if available use: h/p/cosmos coscom (= 1) 8 = TM treadmill emulation in miles per hour if available use: h/p/cosmos coscom (= 1) 10 = Loop Back Test (special test plug required, available at h/p/cosmos) 11 = SunTech Tango blood pressure monitor (signal tunnel/loop only) 12 = Remote Control Hardware Terminal MCU 4 (special hardware required) 20 = h/p/cosmos coscom v3 with baud rate 115200 bps For advanced h/p/cosmos coscom v3 connections with baud rate 115200, please select OP20=20. Please note that the connected devices/software must be approved for h/p/cosmos coscom v3 with baud rate 115200 (for example h/p/cosmos para control® 4.1).
OP21	RS232 interface protocol: COM 2	See descriptions above
OP23	RS232 interface protocol COM 4	DISTANCE indicates flashing: Number of the RS232 interface protocol ELEVATION and HEART RATE reports: OFF = RS232 not active / no protocol / interface deactivated 18 = Chip-card reader PROXOMED (special hardware required) 20 = h/p/cosmos coscom v3 / baud rate 115200 bps 22 = POLAR W:I:N:D: - System (more adjustments in user option OP19 und administrator option OP16) 23 = Chip-card reader ProMedPlus (special hardware required)#
OP27	Minimum acceleration and deceleration level The selected minimum level is valid for all acceleration and deceleration processes in all modes and profiles.	DISTANCE flashes, reports the min. acceleration / deceleration for all modes and profiles (standard: level 1) Level of settings: 1 ... 5 but not higher than the value in option 28. For safety reasons, the acceleration / deceleration levels 5, 6 and 7 cannot 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 29 or in the corresponding command of the h/p/cosmos coscom protocol.
OP28	Maximum acceleration and deceleration level The selected maximum level is valid for all acceleration and deceleration processes in all modes and profiles	DISTANCE flashes, reports the max. acceleration / deceleration for all modes and profiles (standard: level 4) The maximum acceleration and deceleration level is NOT valid for control and operation via V24/RS232 interface. In this case the acceleration and deceleration level is set in option 29 or in the corresponding command of the h/p/cosmos coscom protocol.

Option	Description	Comment / Display
OP29	Standard 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. DISTANCE flashing, reports: 1 ... 5, (standard: 1) for the acceleration and deceleration level for all speed commands via RS 232. The maximum adjustable value depends on the setting of option 28. Note: If the peripheral equipment sends an acceleration and deceleration command via the h/p/cosmos coscom protocol, the selected level in option 29 or in the corresponding command of the h/p/cosmos coscom protocol.
OP40	Locking and unlocking of the treadmill	OFF = After switching on, the treadmill is completely locked / not accessible. To unlock the treadmill, press the buttons +, - and START simultaneously. While locked the display shows "no ACCESS" ON = treadmill is unlocked / accessible (standard)
OP41	Locking and unlocking the manual mode	OFF = manual mode is locked / not accessible ON = manual mode is unlocked / accessible (standard)
OP42	Locking and unlocking the profile mode	OFF = profile mode is locked / not accessible 1 ... 6 = 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 – 6 cannot be selected
OP43	Locking and unlocking the cardio mode	OFF = cardio mode is locked / not accessible ON = cardio mode is unlocked (standard)
OP44	Locking and unlocking the test mode	OFF = test mode is locked / not accessible 1 ... 94 = test mode is unlocked / accessible up to the selected test profile number standard: 24 selected test number = 5: The test profiles 1-5 can be selected, the test profiles 6 – 94 cannot be selected
OP45	Report mode display “Index“ INDEX	0 = Display alternates (default) 1 = Display permanently in MET 2 = Display permanently in kJ 3 = Display permanently in Watt After total switch off the default value 0 will be valid again.
OP46	Report mode display “Elevation“ ELEVATION in profile mode and test mode	0 = Display alternates (default) 1 = Display permanently in % or degree (°), depending on OP14 2 = Display permanently in “Step“ After total switch off the default value 0 will be valid again.
OP47	Sustain values in display resp. automatic “Reset“	OFF = Display values are deleted after pressing START again or automatically 2 minutes after having pressed STOP (default) ON = Display values will be continued (added) after pressing START again and will not be automatically deleted by pressing STOP. Display values can only be deleted by pressing the STOP key twice (time, distance, energy).

Option	Description	Comment / Display
OP48	Program step countdown	OFF = The time display counts up each program step ON = The time display counts down each program step
OP52	Output interval for printer protocol	By entering a value between 0 and 100, the output interval is set in seconds for a printer directly connected to the treadmill. Standard: 60 (= printout of all values once per minute). The value 0 disables printing of individual values, but not printing of headers and end results (UKK).
OP53	Language settings for printer protocol	Select the language for printouts on a printer directly connected to the treadmill. One of six languages can be chosen. Both, the protocol printout and the test result and training recommendation of the UKK 2 km walking test are printed in the selected language. EnGL = English (standard) SPAn = Spanish GErM = German POrt = Portuguese FrEn = French HUnG = Hungarian For correct printout, the connected printer must be compatible with PCL printer language. For special characters the ISO 8859-1 (Latin-1) font is used.

18 Annex II (Pre- & self-defined tests)

18.1 UKK walk test

UKK stands for Urho Kaleka Kekkonen, founder of the UKK Institute in Tampere, Finland.

The UKK walk test is a fitness test, calculating the UKK Fitness Index based on the measured heart rate within a 2 km walk at max. walking speed. The test requires POLAR heart rate measurement.

A UKK Fitness Index of 100 represents an average fitness.

A UKK Fitness Index <100 represents below average fitness, a UKK Fitness Index >100 represents above agerage fitness.

The UKK Fitness Index is calculated as follows (according to gender):

Men: Fitness Index = 420 + A x 0.2 – (T x 0.19338 + HR x 0.56 + [W : (H x H) x 2.6])

Women: Fitness Index = 304 + A x 0.4 – (T x 0.1417 + HR x 0.32 + [W : (H x H) x 1.1])

A (age) = Age in years, HR (heart rate) = average heart rate during test in bpm, T (time) = walking time for 2 km in s,
W (weight) = subject weight in kg, H (height) = subject height in m

Before performing the UKK walk test, the subject must warm up and determine the max. walking speed.

During the test, the subject must walk as fast as possible for 2 km (heart rate approx. 80% of max). The subject must not run.

The treadmill measures the heart rate (via polar heart rate measurement) every 500 m.

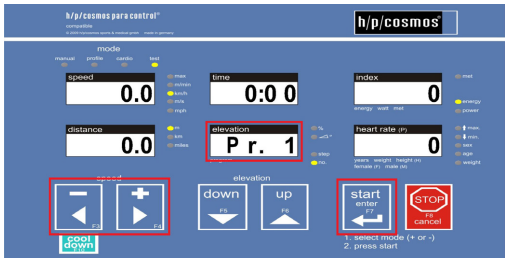
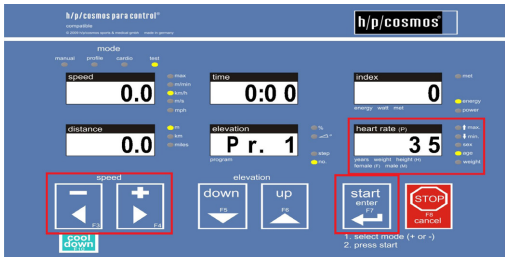
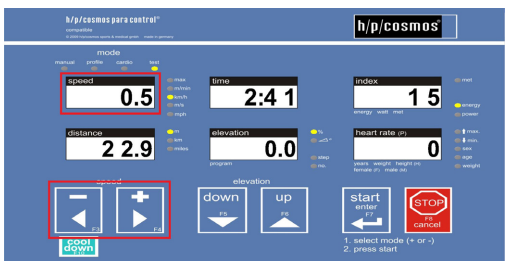
Affter performing the test, the UKK Fitness Index is displayed.

The UKK walk test is suitable for subjects between 20 and 65 years old.

For subjects older than 65 years or overweight subject the results will be less accurate.

Athletes usually do not reach the required heart rate.

Refer to “test mode” for safety information and adjustment.

Basic functions	Buttons / displays	Further information
Select “test mode” with “+” or “-“ button Selected mode flashes. Confirm with “enter”. “PR 01” flashes. Confirm with “enter”.		Device must be in “mode selection” (one of the mode LEDs flashes) To get there, cancel all other activities by pressing the “stop”-button.
Set – gender, – age, – height – weight with “+” or “-“ (corresponding LED flashes) Confirm each parameter with “enter”.		
Select walking speed with “+” or “-“. After 2,0 km, the speed is reduced to 50%. After 5 more minuntes the test is terminated. At the end the “index” display shows the UKK fitness index.		

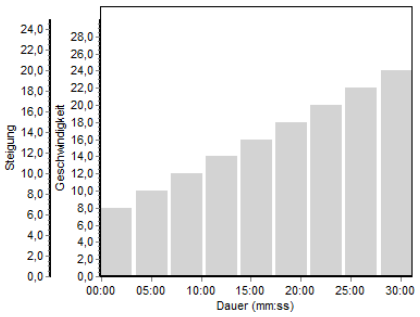
In case the device receives no or incorrect heart rate signals, an acoustic warning signal occurs.

18.2 Graded test

Description	Illustration

(e.g. for performance diagnostics based on lactate measurement)
Refer to “test mode” for safety information and adjustment.

Parameter	Default value
Starting speed	8.0 km/h
Increment	2.0 km/h
Acceleration level	4
Step length	3:00 min
Break time	0:30 min



Each parameter is adjustable.

STOP must be activated manually by the medical doctor.

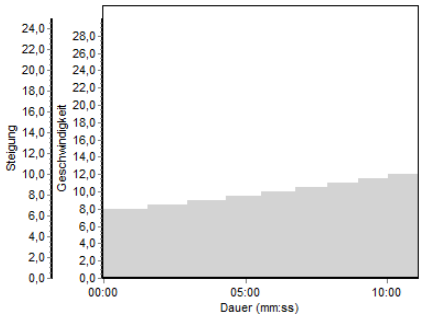
Skip remaining break time:
Press “start” once restart after countdown
Press “start” twice restart immediately

Prolong break:
Press “-“ within break “pause” is indicated
Press “start” to continue test continues with remaining break time

18.3 Conconi test

Description	Illustration

(e.g. for performance diagnostics based on heart rate measurement)
Refer to “test mode” for safety information and adjustment.



Endurance test (max. heart rate test)
Standard load profile:

- Starting speed: 8.0 km/h, must be changed according to the condition of the subject
- Circuit (lap length): 200 m (can be changed)
- Increment: 0.5 km/h (can be changed)

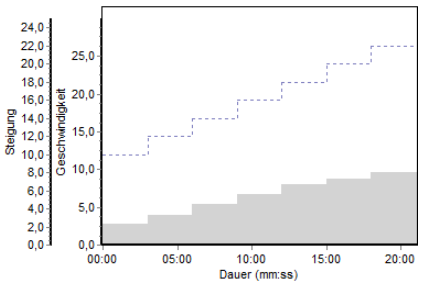
STOP must be activated manually by the medical doctor

18.4 Bruce protocol

Description	Illustration

e.g. for ECG stress test
Refer to “test mode” for safety information and adjustment.

Step	Duration (min)	Speed (km/h)	Elevation (%)
1	3:00	2.7	10
2		4.0	12
3		5.4	14
4		6.7	16
5		8.0	18
6		8.8	20
7		9.6	22

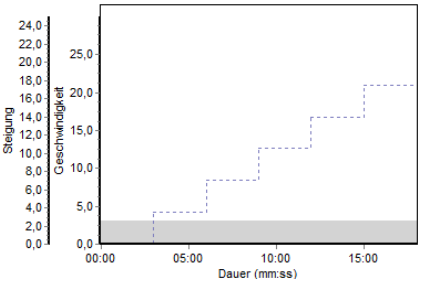


18.5 Naughton protocol

Description	Illustration

e.g. for ECG stress test
Regard chapter “test mode” for safety information and adjustment.

Step	Duration (min)	Speed (km/h)	Elevation (%)
1	3:00	3.0	0.0
2			3.5
3			7.0
4			10.5
5			14.0
6			17.5

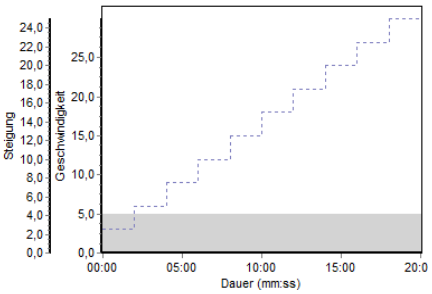


18.6 Balke protocol

Description	Illustration

e.g. for ECG stress test
Refer to “test mode” for safety information and adjustment.

Step	Duration (min)	Speed (km/h)	Elevation (%)
1	2:00	5.0	2.5
2			5.0
3			7.5
4			10.0
5			12.5
6			15.0
7			17.5
8			20.0
9			22.5
10			25.0



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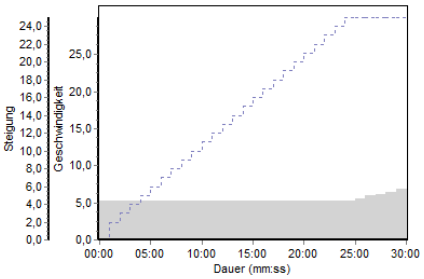
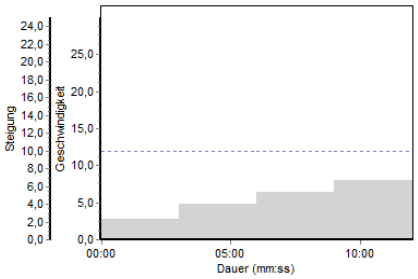
18.7 Cooper protocol

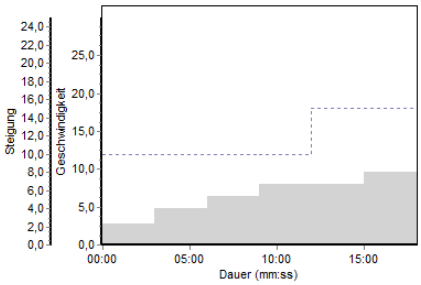
Description	Illustration
e.g. for ECG stress test Refer to “test mode” for safety information and adjustment. ▮ Start at 5.3 km/h and 0% elevation ▮ After 1 minute elevation increases to 2 % ▮ After another minute, the elevation is increased by 1% every minute ▮ When elevation is 25 % elevation stays constant and the speed is increased by 0.32 km/h every minute STOP must be activated manually by the medical doctor.	

18.8 Ellestad A protocol

Description	Illustration
e.g. for ECG stress test Regard chapter “test mode” for safety information and adjustment.	

Step	Duration (min)	Speed (km/h)	Elevation (%)
1	3:00	2.7	10.0
2		4.8	
3		6.4	
4		8.0	

18.9 Ellestad B protocol

Description	Illustration
e.g. for ECG stress test Refer to “test mode” for safety information and adjustment.	

Step	Duration (min)	Speed (km/h)	Elevation (%)
1	3:00	2.7	10.0
2		4.8	10.0
3		6.4	10.0
4		8.0	10.0
5		8.0	15.0
6		9.6	15.0

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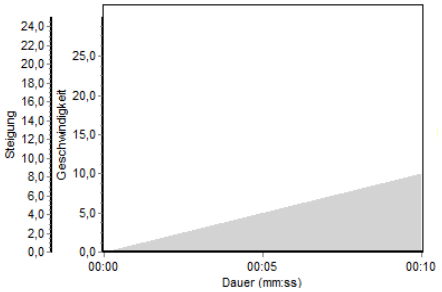
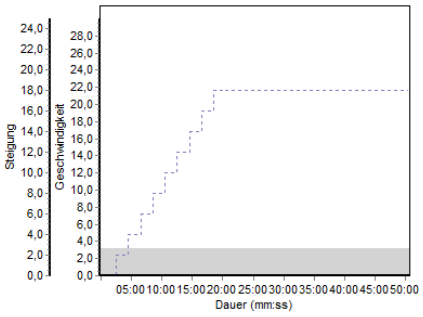
18.10 Ramp profile

Description	Illustration
(not available for every model) Refer to “test mode” for safety information and adjustment. Ramp profile with 2 parameters: ▮ Target speed standard: 10.0 km/h; adjustable from 0 to maximum speed of the treadmill. ▮ Time for reaching target speed in seconds: standard: 10 seconds; adjustable from 0 to 99 seconds	

18.11 Gardner test protocol

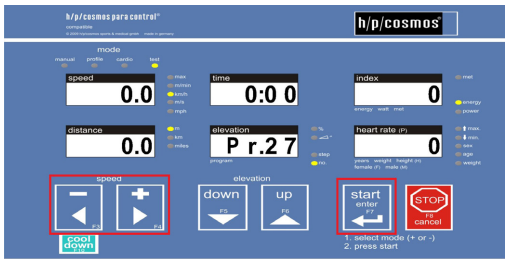
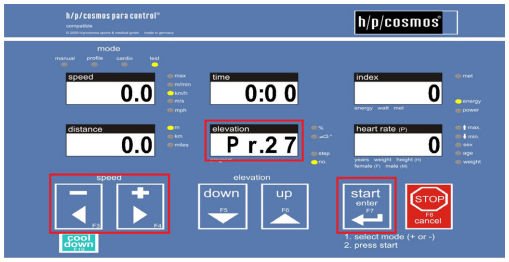
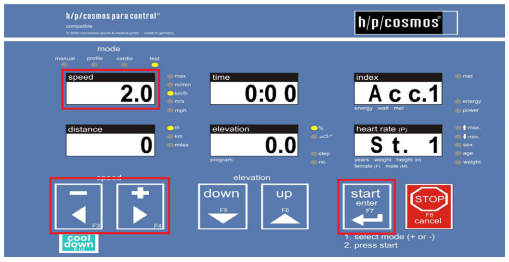
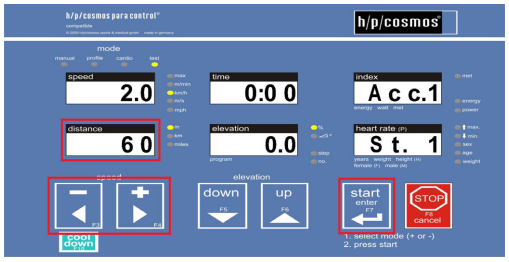
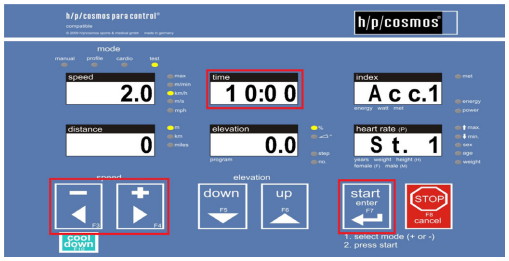
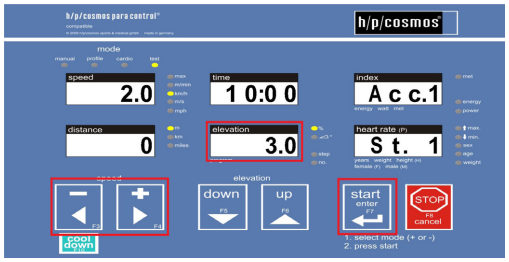
Description	Illustration
For application in angiology Refer to “test mode” for safety information and adjustment. Pre-test phase: Patient stands on the footboards, not on the belt.	The Gardner test protocol serves to evaluate the maximum walking distance of peripheral arterial disease patients with intermittent claudication. The test is to be performed under constant supervision of a medical doctor. The patient first stands on the side footboards of the running machine and not on the belt. Start test profile 11 and the belt speeds up to 3.2 km/h. As the patient steps onto the running belt, the doctor presses the START key again. By pressing the START key the second time, the displays will be reset to zero. After completing the test, the results can be printed on a host printer if connected.

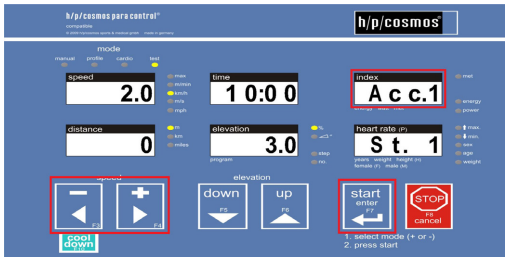
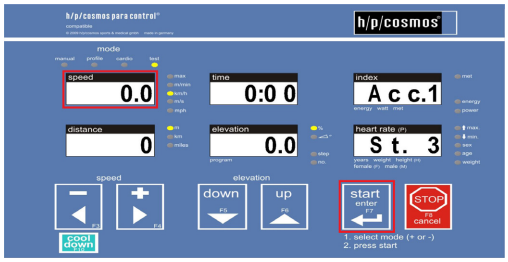
Step	Duration (min:sec)	Speed (km/h)	Elevation (%)	Total time (min:sec)
0	until START is pressed	3.2	0	until START is pressed
Test phase: Patient steps onto the running belt.				
1	02:00	3.2	0	2:00
2	02:00	3.2	2	4:00
3	02:00	3.2	4	6:00
4	02:00	3.2	6	8:00
5	02:00	3.2	8	10:00
6	02:00	3.2	10	12:00
7	02:00	3.2	12	14:00
8	02:00	3.2	14	16:00
9	02:00	3.2	16	18:00
10	02:00	3.2	18	20:00
11	30:00	3.2	18	50:00



18.12 Self-defined tests

Tests 21 – 28 are freely definable with up to 40 program steps.
Follow the instructions below to program an individual test.
The “heart rate” display will show the current program step.
Use “up” and “down” to scroll through the program steps.

Basic functions	Buttons / displays	Further information
Select “test mode” with “+” or “-“ button Selected mode flashes. Confirm with “enter”.		Device must be in “mode selection” (one of the mode LEDs flashes) To get there, cancel all other activities by pressing the “stop”-button.
Select self-defined test (21 – 28) with “+” or “-“ Confirm with “enter” for at least 5 s.		
Select speed for step 1 with “+” or “-“. Confirm with “enter”.		
Select distance for step 1 with “+” or “-“. Confirm with “enter”.		Select distance “0” in order to program this step by time.
Select time for step 1 with “+” or “-“. Confirm with “enter”.		Select time “0:00” in order to program this step by distance.
Select elevation for step 1 with “+” or “-“. Confirm with “enter”.		

Basic functions	Buttons / displays	Further information
Select acceleration for step 1 with “+” or “-“. Confirm with “enter”.		The acceleration level is displayed in the “index” display.
Proceed the same way for further steps. Make sure all steps after the last one have a speed of “0 km/h”. Press “start” for at least 5 s to save the program and exit programming.		

19 Annex III (Accessories)

19.1 Arm support, adjustable [cos12013]

Title	Description
Short description	The h/p/cosmos arm supports are a simple solution for unweighting of the subject. Height and width adjustability offers a wide field of application.
Illustration	
Application	Adjust the arm support by pulling the locking element and turning the segments. Hold free segments with other hand. Scales on each joint allow reproducibility.
Additional safety information	▮ Do not adjust under load. ▮ Use caution at squeeze and shear points. ▮ Make sure the hand grips are in upright position during use. ▮ Do not use for running. ▮ Position arm supports outside of training area when running. ▮ Do not use on bare skin. ▮ Do not leave the arm support in a position that projects into running area ▮ Before loading, make sure the adjustment elements are correctly locked. ▮ Do not use the arm supports with reverse belt rotation.
Technical data	Adjustability: Height and width via 3 joints Measurements: 480 x 425 x 260 mm each (packed) Weight: 10.7 kg each Max. subject weight: 140 kg Max. subject weight of treadmill is reduced when combined with arm support.
Additional accessories	cos100680 additional keyboard for arm support cos14135 keyboard holder for arm support cos10107 additional stop button in right arm support cos10108 additional stop button in left arm support
Installation	By h/p/cosmos service personnel, only
Further information	https://www.h-p-cosmos.com/en/products/individual-products/adjustable-arm-supports-scale-0deg-handrail-shape

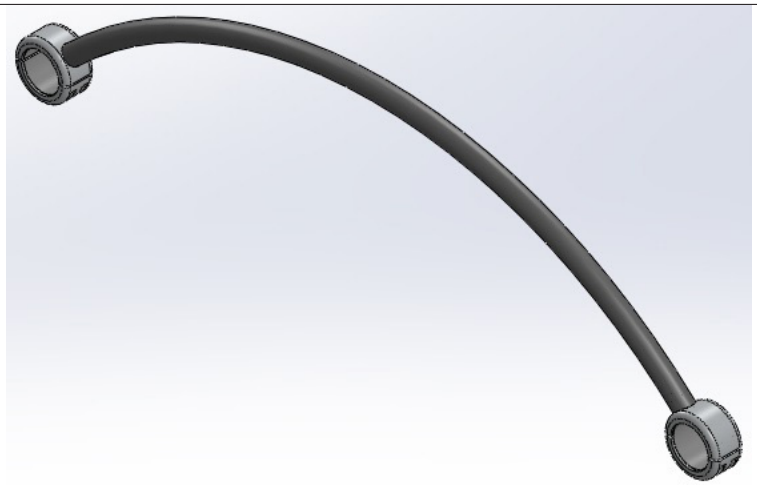
19.2 Arm support, optional stop button [cos10107, cos10108]

Title	Description
Short description	Additional emergency stop, integrated into arm support
Illustration	

Application	Operation	Result	Release	Restart
	Push button	Running belt stops with predefined deceleration Movement of elevation system stops UserTerminal displays “pull stop” Mains connection and interface communication not interrupted	Release button	Restart application

Additional safety information	N/A
Technical data	N/A
Additional accessories	N/A
Installation	By h/p/cosmos service personnel, only
Further information	https://www.h-p-cosmos.com/en/products/individual-products/additional-stop-button-right

19.3 Crossbar front rail [cos16571-01]

Title	Description
Short description	Crossbar for additional balance control
Illustration	
Application	Patient may hold crossbar front rail for balance control Holding handrails during use affects exercise results.
Additional safety information	N/A
Technical data	Length: 850 mm Diameter: 30 mm Weight: 2.4 kg
Technical data	N/A
Installation	By h/p/cosmos service personnel, only
Further information	https://www.h-p-cosmos.com/en/products/individual-products/handrail-crossbar-5036-arched-grip-cover

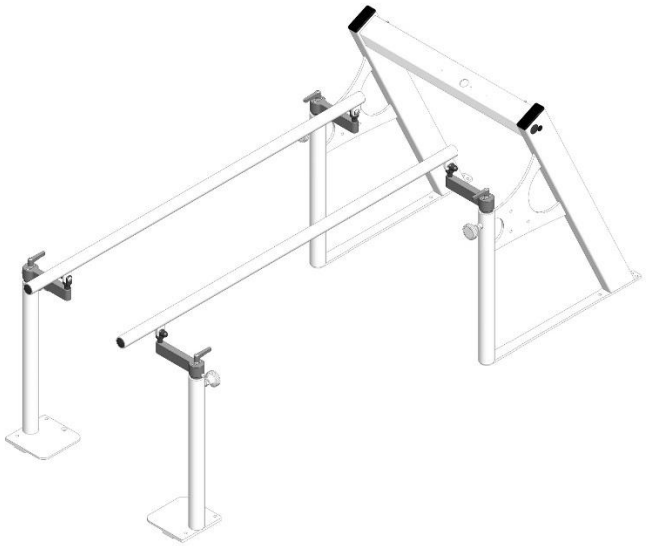
19.5 Emergency stop retrofitting [cos15933, cos100548, cos15294]

Title	Description	
Short description	Additional emergency stop buttons	
	cos15933	Emergency stop button with magnet holder 5m
	cos100548	Emergency stop button with magnet holder 10m
	cos15294	Emergency stop ext. without attachement 5m
	cos15294 L10m	Emergency stop ext. without attachement 10m
	cos15294 L15m	Emergency stop ext. without attachement 15m
Illustration	with magnet holder	without attachement

Application	Operation	Result	Release	Restart
	Push button	Running belt stops with predefined deceleration Movement of elevation system stops UserTerminal displays “pull stop” Mains connection and interface communication not interrupted	Release button	Restart application

Additional safety information	N/A
Technical data	N/A
Additional accessories	N/A
Installation	By operator
Further information	https://www.h-p-cosmos.com/en/products/individual-products/emergency-stop-button-magnet-holder-5-m-spiral-cable

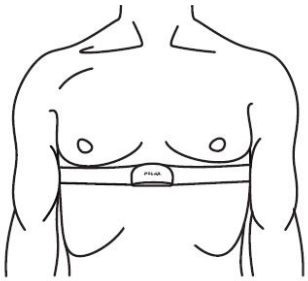
19.6 Handrail, adjustable [cos102010]

Title	Description
Short description	handrails adjustable in height and width at both sides
Illustration	
Application	 Height adjustment: Pull locking knob and move handrail to desired position. Hold free segments with other hand. Width adjustment: Loosen lever, turn swivel arm, tighten lever.
Additional safety information	▮ Do not adjust under load. ▮ Be careful with squeeze and shear points. ▮ Pay attention to the right position of the handrails. ▮ Before loading, make sure the adjustment elements are correctly locked.
Technical data	adjustability: height: 550 – 1200 mm width: 380 – 1040 mm handrail tube length: 150 cm tube diameter: 4 cm weight: 69 kg material: steel tube, powder coated
Installation	By h/p/cosmos service personnel, only
Further information	N/A

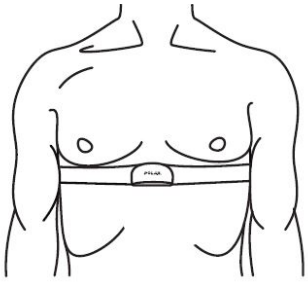
19.7 Handrail, long 2 pillars [cos10145]

Title	Description
Short description	Long handrail for additional safety
Illustration	
Application	Patient has to hold both handrails for stability when entering the treadmill. Patient may hold handrails for balance control. Holding handrails during use affects exercise results.
Additional safety information	N/A
Technical data	Length: 1990 mm Diameter: 60 mm Weight: 22 kg
Additional accessories	N/A
Installation	By h/p/cosmos service personnel, only
Further information	N/A

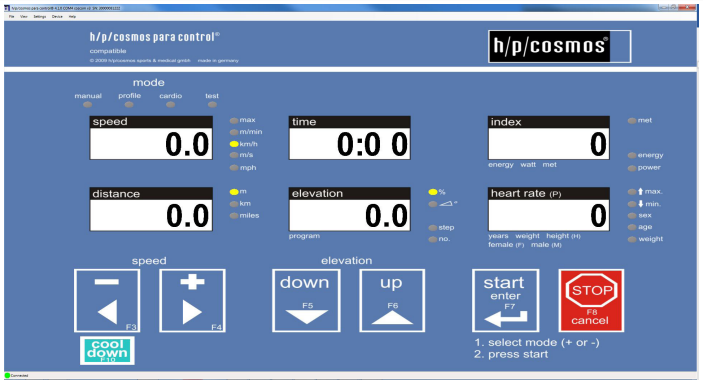
19.10 Heart rate measurement POLAR non-coded [cos102818]

Title	Description
Short description	Heart rate measurement, non-coded
Illustration	
Application	Apply chest belt as shown: 
Additional safety information	▮ WARNING! Heart rate monitoring systems may be inaccurate. ▮ Incorrect or over exercising may result in serious injury or death. ▮ If you feel faint or dizzy stop exercising immediately and consult a medical doctor.
Technical data	Transmission radius: approx. 1m Further data see accompanying POLAR documents or www.polar.com. Troubleshooting: In case the heart rate is not displayed: - Chest belt might be applied incorrectly (see application above) - Other chest belt than POLAR T31 or T34 is used (see print) If the heart rate is not displayed or displayed incorrectly: There might be interferences with - Screens, computers, printers, mobile phones and any radio engineering systems - Electric devices, electric motors, transformers - High-voltage transmission lines, also from trains - Strong fluorescent tubes nearby - Central heating radiators - Other electric devices In order to prevent interference of the running machine, place the device at some distance away from such sources of interference. Do not rely on the indicated values if you suspect interference. Please refer to the instructions provided by the manufacturer, POLAR.
Additional accessories	cos10905 POLAR chest belt XS cos10906 POLAR chest belt S cos10165 POLAR chest belt M cos10907 POLAR chest belt L cos10902 POLAR transmitter set T31 cos15178 POLAR transmitter set T34 (extended range)
Installation	By h/p/cosmos service personnel, only
Further information	N/A

19.11 Heart rate measurement POLAR W.I.N.D. coded [cos100106]

Title	Description
Short description	Heart rate measurement coded
Illustration	
Application	Apply chest belt as shown: 
Additional safety information	▮ WARNING! Heart rate monitoring systems may be inaccurate. ▮ Incorrect or over exercising may result in serious injury or death. ▮ If you feel faint or dizzy stop exercising immediately and consult a medical doctor.
Technical data	Transmission radius: approx. 10m Further data see accompanying POLAR documents or www.polar.com. <u>Troubleshooting:</u> In case the heart rate is not displayed: - Chest belt might be applied incorrectly (see application above) - Other chest belt than POLAR W.I.N.D. is used (see print) - Device and chest belt are not connected (see User Option OP 19)
Additional accessories	cos100420b POLAR WIND transmitter TRX24 cos100420c POLAR WIND WearLink chest belt
Installation	By h/p/cosmos service personnel, only
Further information	https://www.h-p-cosmos.com/en/products/individual-products/polar-heart-rate-receiver-wind

19.12 PC-software para control [cos10071-v4.1.0]

Title	Description
Short description	The h/p/cosmos para control is designed for remote control of medical devices. But it does not perform medical diagnosis or evaluation. The read out data shall not be the basis for diagnosis or evaluation. For remote control of all h/p/cosmos running machine and ladder-ergometers with MCU2, MCU3, MCU4 and MCU5. The parameters and the keyboard of the treadmill are displayed on the PC and keys can be simulated for remote control of the running machine or the ladder ergometer.
Illustration	
Application	See separate instructions for use.
Additional safety information	See separate instructions for use.
Technical data	Min. processor: Pentium IV OS Windows XP / Vista / 7 RAM 1 GB (2 GB recommended) Free HD 200 MB Resolution 1280 x 1024 Microsoft .NET Framework 3.5 Service Pack 1 Microsoft® DirectX 9.c
Additional accessories	cos12769-01 USB-RS232 converter cos00097010034 Interface connection cable RS 232 5 m cos00097010035 Interface connection cable RS 232 10 m
Installation	By operator Install from h/p/cosmos demo & info DVD or download from website (see below).
Further information	https://www.h-p-cosmos.com/en/products/software/hpcosmos-para-control-410

19.13 Reverse treadmill belt rotation 150/50 [cos00098100045-02]

Title	Description
Short description	Reverse belt rotation for downhill running / walking
Illustration	
Application	Turn key switch and start device without patient. Observe running belt position and adjust if due. Stop operation and guide patient onto device. Explain and start operation. Repeat procedure for switching to forward direction.
Additional safety information	▮ Do not use without fall prevention. ▮ Do not use without supervisory staff. ▮ Do not switch during motion. ▮ Max. speed for reverse belt rotation is reduced by default.
Technical data	Height: approx. 110 cm (depending on treadmill) Weight: approx. 15 kg (depending on treadmill) Max. pulling force: 50 N per rope
Additional accessories	N/A
Installation	By h/p/cosmos service personnel, only
Further information	https://www.h-p-cosmos.com/en/products/individual-products/reverse-belt-rotation-downhill-15050

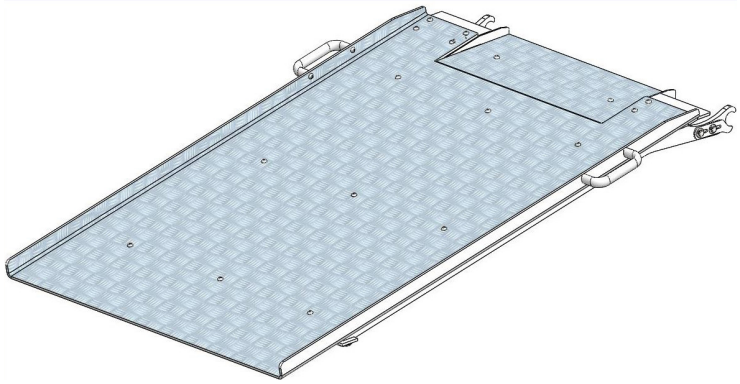
19.14 robowalk expander [cos30022, cos30023]

Title	Description		
Short description	The h/p/cosmos robowalk expander supports gait training. Expander ropes, attached to the limbs, support or load the subject.		
Illustration			
Application	See separate instructions for use.		
Additional safety information	See separate instructions for use.		
Technical data robowalk front [cos30022]	Height: Weight: Max. pulling force:	approx. 110 cm approx. 15 kg 50 N per rope	(depending on treadmill) (depending on treadmill)
Technical data robowalk back [cos30023]	Height: Weight: Max. pulling force:	approx. 80 cm approx. 25 kg 50 N per rope	(depending on treadmill) (depending on treadmill)
Additional accessories	cos101051-XS cos101050-S cos101050-M cos101050-L	leg cuff XS shank leg cuff S thigh leg cuff M leg cuff L	(for circumference 14 … 27 cm) (for circumference 25 … 39 cm) (for circumference 36 … 51 cm) (for circumference 49 … 75 cm)
Installation	By h/p/cosmos service personnel, only		
Further information	https://www.h-p-cosmos.com/en/products/individual-products/robowalk-expander-f-15050		

19.15 Safety arch for treadmill families 150/50 LC and 150/50 [cos10079]

Title	Description
Short description	The h/p/cosmos safety arch is one option to secure the subject from falling. Furthermore, the safety arch stops the treadmill in case of falling.
Illustration	
Application	See “fall prevention”
Additional safety information	See safety information for the treadmill.
Technical data	Max. subject weight: 200 kg Max. subject height: 200 cm Min. triggering force: approx. 100N (~10kg) Min. room height: 250 cm (treadmill at 0% elevation) 260 cm (treadmill at max. elevation)
Additional accessories	cos14903-03-XXS (chest circumference 45 … 65 cm) cos14903-03-XS (chest circumference 55 … 75 cm) cos14903-03-S (chest circumference 65 … 95 cm) cos14903-03-M (chest circumference 85 … 115 cm) cos14903-03-L (chest circumference 105 … 135 cm) cos14903-03-XL (chest circumference 125 … 155 cm)
Installation	By h/p/cosmos service personnel, only
Further information	https://www.h-p-cosmos.com/en/products/individual-products/safety-arch-50-harness-chest-belt-fall-stop-prevention

19.16 Wheelchair ramp [cos16186-02]

Title	Description
Short description	Wheelchair ramp supports entering the device with wheelchair subjects.
Illustration	
Application	Push subject with wheelchair onto treadmill. Connect subject to fall prevention device. Support subject so they can stand upright. Remove wheelchair. Start application.
Additional safety information	▮ Do not use the device with wheels (bikes, wheelchairs, inline skates, etc.). ▮ Unmeant trapping hazards: Take off ties, scarfs or other clothes that may be trapped. Secure long hair and ribbons during maintenance and training in order to prevent being captured in trapping zones. The ramp must not touch the running belt. Make sure the ramp cannot slip. Always enter from the back, not from the side. Do not install the ramp when running belt is in motion.
Technical data	Length: 1241 mm Width: 823 mm Height: 126 mm Weight: 22.0 kg
Additional accessories	N/A
Installation	By operator
Further information	N/A

20 Contact

For any service or sales enquiries, please have the model type and serial number of your device ready.
For service support, we recommend using Skype with webcam.

Service
phone +49 18 05 16 76 67 (0,14€/min from German landlines, max. 0,42€ from German mobile networks)
fax +49 18 05 16 76 69
email service@h-p-cosmos.com
Skype @h-p-cosmos.com (search & select name)

Sales
phone +49 18 05 16 76 67 (0,14€/min from German landlines, max. 0,42€ from German mobile networks)
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