h/p/cosmos®

biomechanics

instrumented treadmills

ahead of time®

gaitway® 3d with inclination module and satellite PC med

reliable treadmills made in germany

German Engineering since 1988

Benefit from our experience since 1988 in building and servicing standard and customized treadmill solutions around the globe.

mercury® med in special matt black design RAL9005 [cos103019]

quasar® (MCU6) with optional safety arch [cos10079-01va02] and special matt black design RAL9005 [cos103019]

The h/p/cosmos standard

h/p/cosmos has been developing and building treadmills since 1988 in Germany for various fields including fitness, competitive sports, sports medicine, orthopedic and neurological rehabilitation, sport science, biomechanics, uniformed services, performance diagnostics, cardiopulmonary diagnostics and rehabilitation. This experience, maximum standards in quality and advanced technology are the foundation of our business and reflected in all treadmills, systems and products.
The outstanding level of h/p/cosmos products and service as well as attractive prices form the h/p/cosmos standard.

Stable and low-maintenance

With their stable frame, the treadmills are almost indestructible, very low-maintenance and offer both runner or patient a pleasant running feeling thanks to their state-of-the-art design. They also stand out due to their smooth running, their versatile functions, their powerful drive systems and their timeless and user friendly design.

Medical device (class IIb) and sports treadmills

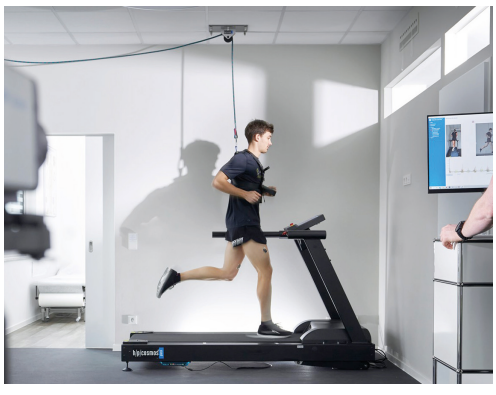
Our treadmills are available as risk class IIb medical treadmills as well as sports treadmills. As a medical device, they are particularly suitable for the use in the fields of cardiology, neurology, cardiological rehabilitation and physiotherapy. The interface via coscom® v4 of the h/p/cosmos treadmill and ergometer series enables the connection to ECG, ergospirometry systems, blood pressure monitors and software programs.

Customer-specific configuration for individual solutions

Treadmills off the peg can be many, at h/p/cosmos you can also get your individually assembled treadmill solution with a large selection of options and accessories. Too little budget for the desired configuration? Changed demands on the treadmill system due to new business areas or new areas of application? No problem, most options and accessories can also be retrofitted at a later date. With h/p/cosmos you are always on the right track, because you cannot make the wrong decision due to the flexible and modular design.

core competence biomechanics

h/p/cosmos gaitway® 3d with UserTerminal MCU6 and inclination module in matt black



Instrumented h/p/cosmos treadmill with ceiling-mounted fall prevention

On demand, unfiltered data and parallel data streams meet highest scientific standards and facilitate evaluation

Biomechanical applications have special requirements. We have the right solutions for your applications.

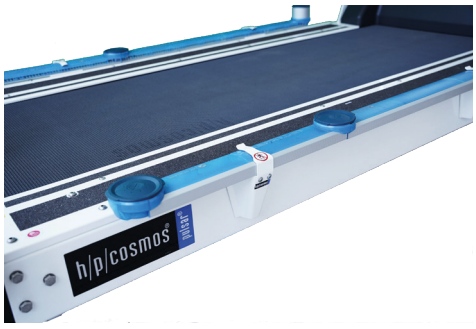
- **Frame color in special matt black design RAL9005**
  to avoid disturbing reflections during camera applications
- **Flexible handrail concept**
  allows utmost flexibility and clear view of the hips
- **Detachable handrails & handrail pillars**
  for unrestricted vision, the cameras capture every angle
- **Fall-stop prevention through ceiling mount**
  safety for athlete or patient with simultaneous unrestricted view
- **Science Port**
  a speed-sensor delivers exact and unfiltered speed values
- **Flexibility**
  quick and uncomplicated transport of the treadmill e.g. with retractable wheels
- **Climate chamber / altitude chamber**
  technical special solutions for altitute, freezing and humid environments
- **Reverse belt rotation**
  enables eccentric training / downhill running
  (when simultaneously using reverse belt rotation and inclination)
- **Extended connectivity**
  different remote controls and software solutions facilitate the work, e.g. with other systems such as ECG, spiroergometry, ECC, MoCap, IMUs, EMG, etc.

Perturbation

The perturbation option was developed for special therapy and training applications. Relying on our powerful motors, extremely fast, jolting acceleration and deceleration of the running belt are possible, simulating slipping or tripping. A safety arch is mandatory for these applications.

always the right solution

The wide range of biomechanical applications requires variable solutions. With our different, scalable biomechanics concepts, we offer you the best possible tools to generate valid data for your tasks.



h/p/cosmos treadmill with optofix® and 1.5 m Microgate OptoGait®

Microgate OptoGait®

The proven technology of Microgate is the first step into h/p/cosmos biomechanics. A "carpet of light barriers" is established between 2 bars, which measures the steps incl. associated parameters to the thousandth of a second while the athlete or patient is running on the treadmill. The foot breaks through the respective LEDs and the software takes the speed of the treadmill into account. The minimum length of the bars is 1.0 m and can be extended in 0.5 m steps.

The software allows a live display of values of symmetry or asymmetry in the left-right comparison, ground contact times and step lengths. These values are not only of great importance in biomechanics, but also in therapeutic use.

Trigger signals can be output via the integrated trigger output for each initial ground contact (as with a foot switch) and connected to external systems such as EMG or EEG. In this way, different systems can be standardised in terms of time.

Using optofix®, the bars of the system attach magnetically, securely and in an ideal position to the treadmill frame.

h/p/cosmos treadmill with integrated zebris FDM-T platform

zebris FDM-T

The zebris FDM-T system is based on a sensor matrix of several thousand calibrated capacitive pressure sensors mounted under the running belt of the treadmill. The movement of the running belt is compensated so that stable gait and rolling parameters are recorded in the software. No measurement preparations are necessary on the patient and the measurement process can be observed in real time on the screen. In addition to stance, gait and walking analyses, the force distribution under the feet is also displayed. The comparison of gait and running parameters, the force values of the forefoot and heel, as well as a left-right comparison are quickly gathered and precisely summarised together with the treadmill parameters in a clear report.

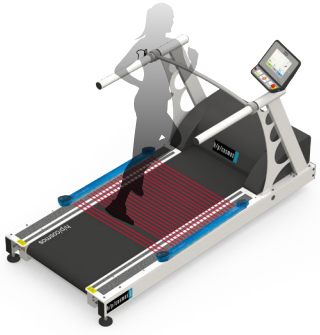
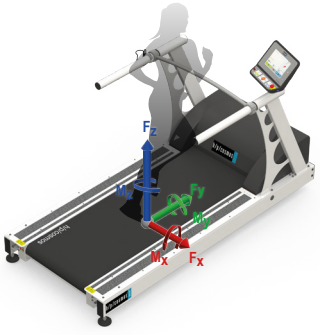
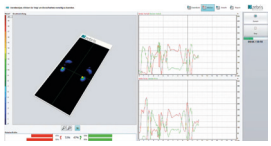
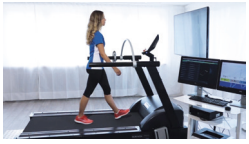
h/p/cosmos gaitway® 3d with inclination module

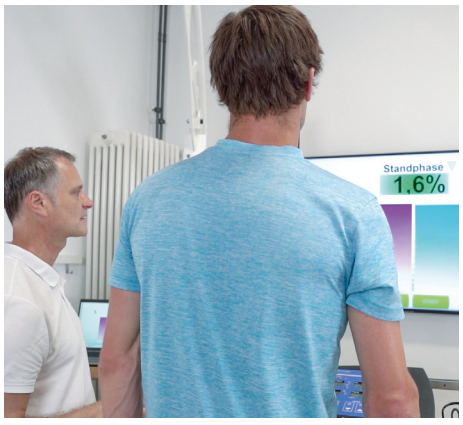
gaitway® 3d

A treadmill, developed by biomechanics for biomechanics. This innovative system got designed and built in a close cooperation between the specialists from Arsalis in Belgium and h/p/cosmos. The entire treadmill (available sizes 150 x 50 cm / 170 x 65 cm / 190 x 65 cm) is mounted on 3D force sensors (strain gauges), which measure forces in three planes. In addition to the vertical ground reaction force, forces are measured in the left-right and forward-backward directions. The treadmill thus functions like a large force plate. A scientifically evaluated algorithm subdivides ground reaction forces during the gait of left and right ground contacts, which means that for the first time no split belt (left and right track are separated, which significantly changes the natural gait pattern) is needed for this application!

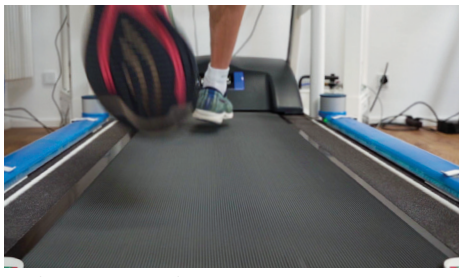
A particularly rigid frame construction underlines the highest standard for precision just as much as the removable handrails and the optional safety arch which are decoupled to minimise vibration characteristics. The gaitway® 3d is bolted to the laboratory floor with its subframe and the optional inclination module. Optionally, the gaitway® 3d can also be seamlessly connected with other biomechanical systems such as zebris FDM-T and via digital interface with MoCap systems (e.g. Qualisys & Vicon).

the systems at a glance

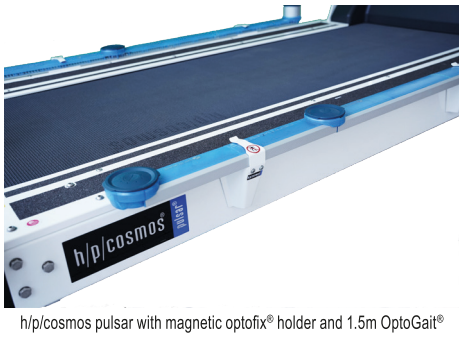
system	Microgate OptoGait®	zebris FDM-T	h/p/cosmos gaitway® 3d
			
sensors	optometric photocells bars placed on foot boards of the treadmill or the ground	5,000-12,000 capacitive pressure sensors underneath the running surface (various options available)	3D load cells underneath the treadmill frame
parameters (see the full parameter list and comparision on page 18)	timing-, gait-, speed-, distance-parameters e.g. step length, cadence, contact time, gait phases online biofeedback training possible	pressure distribution matrix vertical GRF (calculated via pressure and area) e.g. step length, step width, foot rotation, gait phases, contact time, forces divided by foot zones training in virtual reality possible	ground reaction force measurement Fx, Fy, Fz; COP e.g. ground reaction forces, center of mass trajectory, acceleration, shear forces, timing parameters, also in side comparison bio-feedback options
sampling rate	1,000 Hz	100 - 300 Hz (various options available)	10,000 Hz (adjustable)
sync options	TTL trigger output for external devices (e.g. EMG, EEG)	sync in and sync out for automated recording	sync in and sync out for automated recording analog and digital data transfer digital interface to Noraxon, Qualisys, Vicon
video			
			



Live biofeedback allows direct manipulation on gait parameters



optofix® mounts the OptoGait® bars in the ideal position, so jumping off the running belt and onto the footboards is still possible



h/p/cosmos pulsar with magnetic optofix® holder and 1.5m OptoGait®

OptoGait® system can be extended modularly at any time with connecting elements

Microgate OptoGait®

OptoGait® developed by the Italian company Microgate is a pioneering system for movement analysis and functional assessment of a patient under normal or pathological conditions. The system is equipped with optical sensors that operate at a frequency of 1,000 Hz as well as a resolution of approx. 1 cm and records spatiotemporal parameters during walking, running and other types of movement. With the magnetic optofix® holder system (developed by h/p/cosmos) the OptoGait® bars are magnetically attached to the side of the treadmill frame and placed at an optimal height above the running belt. While the athlete is moving on the treadmill, his steps, with the corresponding parameters, are measured precisely to the thousandth of a second. Relying on the proven and widely available RS232 interface, the h/p/cosmos treadmill communicates with the OptoGait® software. If the speed of the treadmill gets adjusted during the test or training, the determined parameters are automatically calculated and displayed correctly. For additional safety, the optional safety arch is available, which prevents a fall and stops the treadmill in such an event.

The optimal number of bars depends on the size of the treadmill and the length of the running surface. The minimum length is 1.0 m and can be extended in steps of 0.5 m.

The software also comes with a biofeedback tool, which allows a live visualisation of the values of symmetry or asymmetry in a left-right comparison. Different step lengths or ground contact times are immediately apparent to the athlete or patient and are particularly important for therapy. Signals from video can be fed and synchronised in the software.

As a special feature, the system also offers a trigger output. With each initial ground contact, a TTL trigger signal is output (similar to a digital footswitch), which can be fed into external systems. Therefore, for example, an EMG or EEG signal can be standardised in terms of time and assessed more reliably.

speedcontrol, an h/p/cosmos solution for automated speed and inclination control, is also based on the OptoGait® system.

Beyond the application on the treadmill, Microgate OptoGait® can be used directly on the floor for jump analyses (e.g. squat jump, drop jump, counter-movement jump) or gait analyses (overground).

Study overview Microgate OptoGait®:

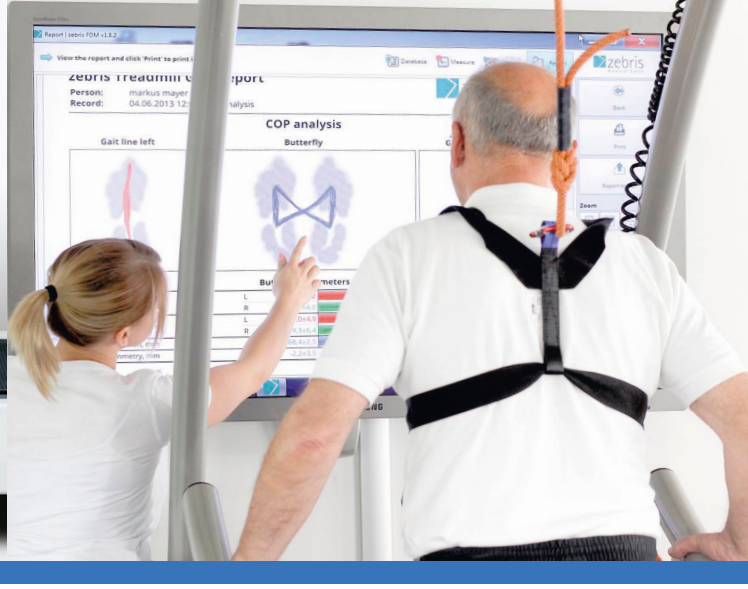
Lienhard, K., Schneider, D., & Maffiuletti, N. A. (2013): Validity of the OptoGait photoelectric system for the assessment of spatiotemporal gait parameters. Medical engineering & physics, 35(4), 500-504.

Kim, K. H., & Lee, S. M. (2014): Effects of forward & backward walking training with progressive body weight supported on stroke patients' ambulatory ability. Physical Therapy Rehabilitation Science, 3(2), 77-85.

Lee, A., Park, J., & Lee, S. (2015): Gait analysis of elderly women after total knee arthroplasty. Journal of physical therapy science, 27(3), 591.

Jaen-Carrillo, D., et al. (2020). Test–retest reliability of the OptoGait system for the analysis of spatiotemporal running gait parameters and lower body stiffness in healthy adults. Proceedings of the institution of mechanical engineers, part p: journal of sports engineering and technology, 234(2), 154-161.

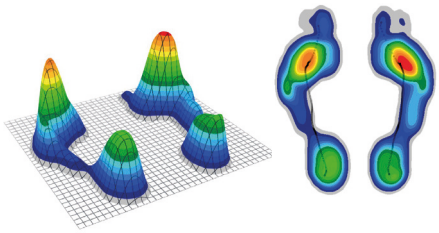
Weart, A. N., et al. (2020). Agreement Between the OptoGait and Instrumented Treadmill System for the Quantification of Spatiotemporal Treadmill Running Parameters. Frontiers in Sports and Active Living, 2, 571385.



zebris Medical GmbH

zebris FDM-T

The zebris FDM-T system is available for h/p/cosmos treadmills with sizes of 150 x 50 cm, 170 x 65 cm and 190 x 65 cm. A sensor matrix of several thousand calibrated capacitive pressure sensors is located right under the running belt. The movement of the belt is compensated so that stable gait and rolling parameters can be analysed. No measurement preparations on the patient are necessary. The measurement process can be observed in real time on the screen.



Clear visualisation of the pressure distribution in the zebris FDM-T software

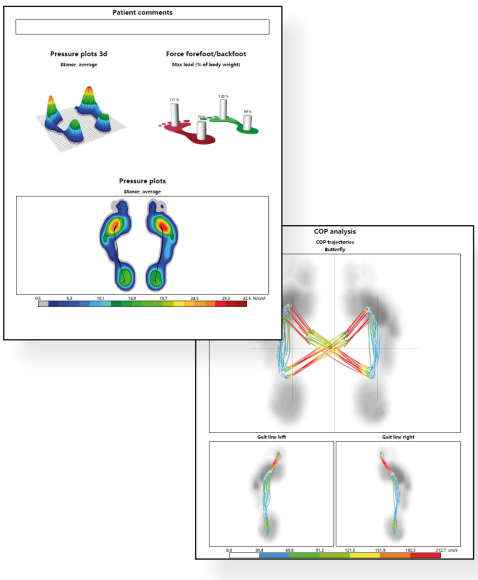
It is suitable for analysing the stance, as well as the gait & walking pattern, uniquely showing the force distribution under the foot. The comparison of gait and running parameters, the force values of the forefoot and heel, as well as a left-right comparison are determined quickly and precisely summarised together with the treadmill parameters in a clear report. The report can automatically be generated in a few seconds. For scientific analyses, raw data of all values can be exported.

h/p/cosmos treadmill with built-in zebris FDM-T platform

In direct comparison to pressure sensors without a treadmill, the system can convince through the high number of step repetitions with simultaneous patient / athlete safety through optional fall protection or unweighting. Other options such as balance training or visual stimulation can be valuable additions, especially in the therapeutic setting.

In gait training with adaptive visual stimulation, the parameters step length, step width and foot angle, which are automatically gathered from the conducted gait analysis, are individually adapted to the targets. The values can remain constant during the entire training or gradually approach the targets during the course of the training. With the intuitively operated software, the course of treatment can be automatically and easily documented by well-founded reports. Optional lighting and camera units are available to record kinematic parameters and for video documentation.

Dual-task training in the virtual reality / environment simultaneously challenges motor and cognitive skills. While walking, the test person solves tasks of varying difficulty that stress perception, memory and calculation. This trains attention skills and deepens the degree of automation of walking. The training can be individually tailored to each patient by choosing from the different modules available.



Standardised and detailed reports visualise the results and create comparability

Study overview zebris FDM-T:

Hollander, K., Riebe, D., Campe, S., Braumann, K. M., & Zech, A. (2014): Effects of footwear on treadmill running biomechanics in preadolescent children. Gait & posture, 40(3), 381-385.

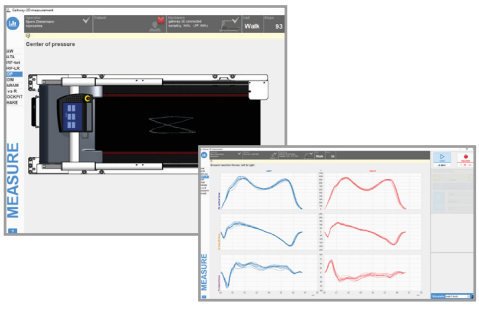
Nüesch, C., et al. (2018). Repeatability of spatiotemporal, plantar pressure and force parameters during treadmill walking and running. Gait & posture, 62, 117-123.

Van Alsenoy, K., Thomson, A., & Burnett, A. (2018). Reliability and validity of the Zebris FDM-THQ instrumented treadmill during running trials. Sports biomechanics.

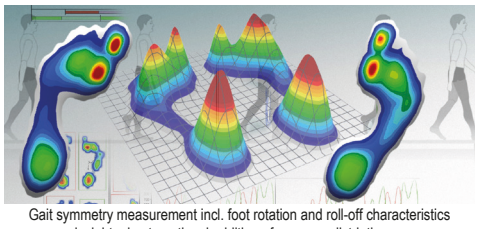
Steib, S., et al. (2019). Exploring gait adaptations to perturbed and conventional treadmill training in Parkinson's disease: Time-course, sustainability, and transfer. Human movement science, 64, 123-132.

Nüesch, C., et al. (2019). The effect of different running shoes on treadmill running mechanics and muscle activity assessed using statistical parametric mapping (SPM). Gait & Posture, 69, 1-7.

h/p/cosmos gaitway® 3d (170 x 65 cm) with optional inclination module



3 axes force measurement Fz, Fy, Fx during running (left) & gait (right)



Gait symmetry measurement incl. foot rotation and roll-off characteristics
more insights due to optional addition of pressure distriution sensors

h/p/cosmos gaitway® 3d

The gaitway® 3d has been developed in close cooperation between h/p/cosmos and Arsalis. It measures ground reaction forces in three axes as well as the the centre of pressure (COP). The gaitway® 3d is currently available in three deck sizes: 150 x 50 cm, 170 x 65 cm or 190 x 65 cm. Each size is optimized for a range of speeds. Using a scientifically evaluated algorithm, the ground reaction forces during gait can be divided for left and right ground contact, which means that for the first time no split belt is needed for this application, so left and right track are not separated, which significantly changes the natural gait pattern.

Based on its extremely rigid construction, the gaitway® 3d is able to record biomechanical signals of maximum quality. To further minimise the vibration characteristics, various components (such as the detachable handrails and the optional safety arch) have been decoupled from the treadmill and the measuring platform. The gaitway® 3d is bolted to the laboratory floor with its sub-frame and the optional inclination module. Optionally, the gaitway® 3d can also be seamlessly connected with other biomechanical systems such as zebris FDM-T and via a digital interface to video / MoCap systems (e.g. Qualisys & Vicon).

Further functions include a patient / athlete scale, the precise acquisition and recording of ground reaction forces at rates of up to 10 kHz, a left and right force measurement for vertical and horizontal force during walking and running and an extensive list of biomechanical parameters for normal and pathological gait patterns.

In addition, the system also allows the display of biofeedback for gait rehabilitation and performance training. Digital start / stop input triggers as well as synchronisation outputs and analogue signal outputs enable the integration of the instrumented gaitway® 3d treadmill into e.g. EMG and motion analysis systems. The gaitway® 3d software is designed for Windows 7, 8 and 10. Automatic updates allow easy expansion of functionalities and a high level of customer support.

The combination of 3D force measurement and pressure distribution in a single system makes the gaitway® 3d one of the world's most advanced treadmills for biomechanics.

Optional pressure distribution measurement

The optional, additional installation of a zebris pressure distribution platform under the running belt can further enhance the field of possible gaitway® 3d application. The evaluation of the pressure distribution provides valuable information such as the COP under each foot during the single and double contact phase, the foot rotation angles and the rolling characteristics.

Study overview h/p/cosmos gaitway® 3d:

Dierick, F., Penta, M., Renaut, D., & Detrembleur, C. (2004): A force measuring treadmill in clinical gait analysis. Gait & posture, 20(3), 299-303.

Van Caekenberghe, I., et al. (2013). Mechanics of overground accelerated running vs. running on an accelerated treadmill. Gait & Posture, 38(1), 125-131.

Meurisse, G. M., et al. (2016). Determination of the vertical ground reaction forces acting upon individual limbs during healthy and clinical gait. Gait & posture, 43, 245-250.

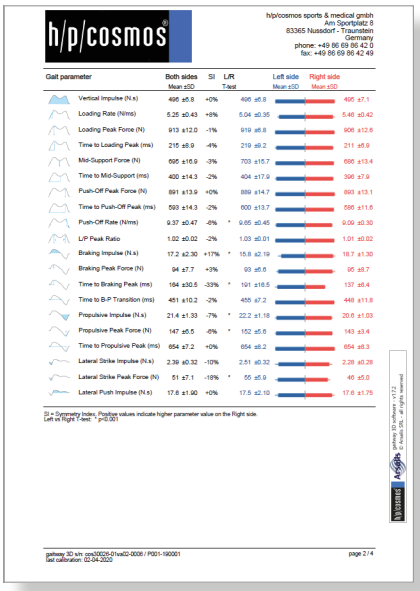
Bastien, G. J., Gosseye, T. P., & Penta, M. (2019). A robust machine learning enabled decomposition of shear ground reaction forces during the double contact phase of walking. Gait & posture, 73, 221-227.

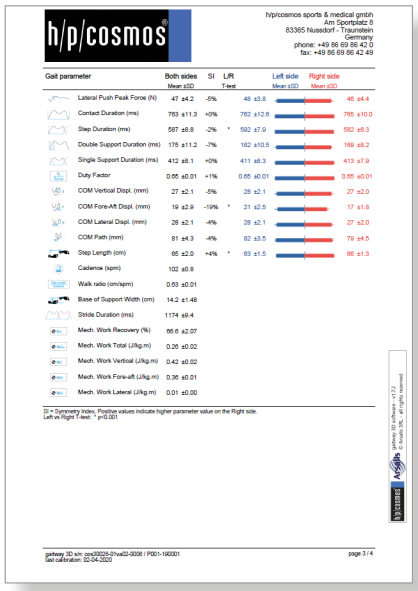
Keshvari, B., et al. (2022). Evaluating the Effect of Shoes with Varying Mass on Vertical Ground Reaction Force Parameters in Short-Term Running. International Journal of Exercise Science, 15(1), 191-205.

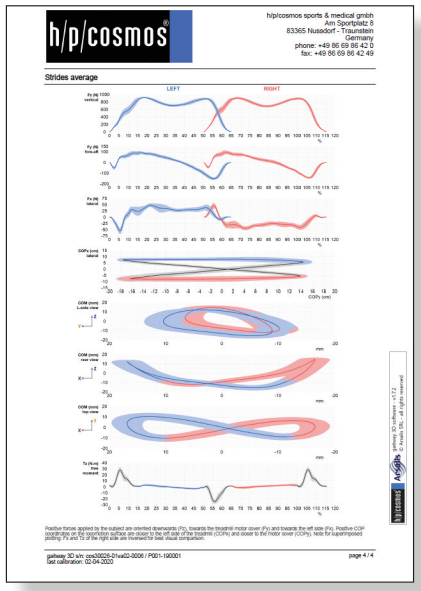
Various options to handle data

All data recorded with the gaitway® 3d are also available in raw format and can be imported into various other software and analysis systems. The raw data are captured sample by sample at a maximum rate of 10,000 Hz. For maximum compatibility with external platforms such as motion capturing software or EMG, the gaitway® 3d is equipped with analogue and digital interfaces and synchronisation options.

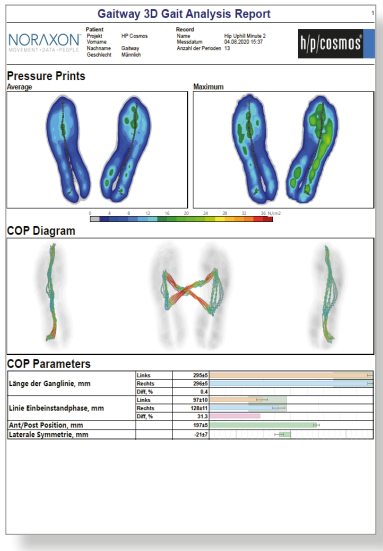
example report of the h/p/cosmos gaitway® 3d software

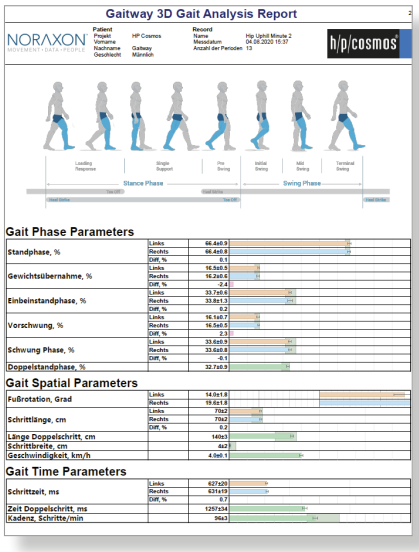


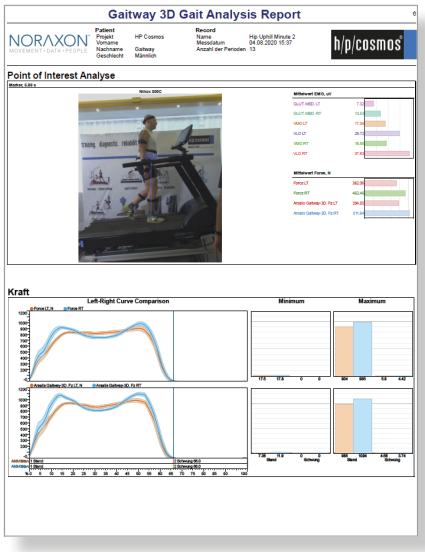




example report of noraxon mr3 software „force meets pressure"

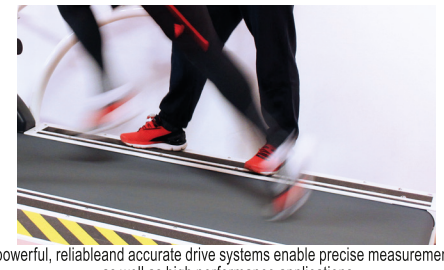






performance options

h/p/cosmos treadmill with safety arch [cos10079-01va02] and chest belt [cos14903-04-M]



powerful, reliableand accurate drive systems enable precise measurements as well as high performance applications

pushing athletes to and beyond their limits is only possible if they feel safe and rely on the safety systems and material

h/p/cosmos speedcontrol [cos100699_LED], based on an optometric system, allows automatic speed and inclination adaption based on the subject's position on the running belt

Additional options for your individual treadmill solution

The numerous additional options allow you to adapt h/p/cosmos treadmills exactly to your needs and your field of application. Some of our most successful options:

Safety arch fall prevention

In the event of a fall, the patient or athlete is caught with a safety harness and the treadmill is automatically stopped. The h/p/cosmos safety arch with chest belt prevents falling in case of tripping and by loss of coordination in the exhaustion phase. The fall-stop stops the treadmill immediately and automatically by use of a quick-stop system. With this feeling of safety it is possible to train right up to the limit which is important for precise diagnostics.

Performance, high-speeds & -accelerations with 3-phase power supply systems

Although performance diagnostics of marathon runners or triathletes only place moderate demands on a treadmill system due to the very economical running style, the diagnosis of athletes from many other sports requires clearly increased performance. Also when sprint and speed tests are conducted with large and heavy athletes, the treadmill system must provide, in these short-term peak loads, accurate repeatable results. Single phase power supplies with only 230 volts are often overwhelmed. To deal with these requirements, we offer 3 phase 400 volts power supplies for most of our treadmills.

Built-in reverse belt rotation

As a standard on the pulsar series, the running direction of the belt can be reverted. With the incline set at the same time, downhill running can be simulated. The option is available for all h/p/cosmos treadmills with incline option.

Speedcontrol

Adapting the treadmill speed to your current speed can be a tough or even distracting task, when running at higher paces. h/p/cosmos speedcontrol has been built to handle speed and inclination according to your individualized presets.

Additional keyboard

The additional keyboard allows trainers or therapist to perfectly control the treadmill from the ideal external spot around the treadmill.

flexible handrail concept

The renewed h/p/cosmos handrail concept allows quick and flexible adaptions of the treadmill to various demands.

Some of our best selling handrail configurations:

pulsar® (MCU5)
with standard handrails

pulsar® med (MCU6)
with optional long handrails [cos103877]

pulsar® (MCU5)
with optional very short handrails [cos103867]

pulsar® med (MCU6)
with optional speed handrails [cos103651]

pulsar® (MCU5)
with optional adjustable handrails [cos102551-01]

pulsar® med (MCU6)
with optional speed handrails [cos103651] and extra wide footboards left [cos14764] and right [cos102187].

Standard and long handrail

The ingeniously simple plug-in concept makes it a child's play to change the handrails and adapt them to the required application. As standard we deliver all treadmills of the pulsar® series with handrails, which cover about one third of the running surface length. By quickly loosening two hex head screws, the short handrail can be easily removed and replaced by the therapist or trainer with a long handrail (reaching to the end of the running surface), either on one side or on both sides (for extended safety when stepping onto the running deck).

Very short handrail

For special applications, the handrails can be completely removed. Due to safety reasons, a crossbar must then be used, which is mounted on two very short handrails or on speed handrails with additional grips for better jump-on and jump-off during hyperspeed sprint trainings. This variant makes sense, for example, if a video analysis in the sagittal plane is carried out or an ECG stress test in cardiology (handrail might interfere with cable routing).

Adjustable handrail

The pulsar® treadmills can also be supplied with height and width adjustable handrails. This variant is ideal if you serve a heterogeneous clientele (adjustment range is from 765 ... 1,215 mm in height and 665 ... 1,315 mm in width, serving most subjects). They offer optimal conditions for therapy and/or training of different patient types from children, to small and large persons as well as for obese patients. In combination with the optional arm support, you also enable patients to train more safely and without fear. As an additional feature, the optional arm support offers the possibility of a manual unweighting by the patient relieving their partial body weight on these stable pads.

configuration microgate optogait®: gait/running analytics basic

recommended configuration retrofit gait / running analysis for treadmills with a running deck size of 150 x 50 cm

pos.	qty.	order number	product description		
1.	1	cos102065	**Microgate OptoGait® Kit 1 single metre** Content: 1xTX, 1xRX bar with interface, 2 webcams, 2 tripods, USB cable, power supply, software, bag for 1 meter.		
2.	1	cos103386	**Optofix® mounting kit** Holder system with magnets for OptoGait® bar to mount it on h/p/cosmos treadmill (not for extra wide footboards). This set consists of 4 fastening profiles.		
3.	1	cos10075	**transport / shipping charge**		
			total price net, excluding VAT, excluding custom duties		
			VAT (19 % in Germany, other VAT and/or custom duties may apply in other countries)		
			system price h/p/cosmos solution for gait training: please ask your dealer for a quotation		

configuration microgate optogait®: gait/running analytics advanced

recommended configuration retrofit gait / running analysis for treadmills with a running deck size of 170 x 65 cm - 200 x 75 cm

pos.	qty.	order number	product description		
1.	1	cos102065	**Microgate OptoGait® Kit 1 single metre** Content: 1xTX, 1xRX bar with interface, 2 webcams, 2 tripods, USB cable, power supply, software, bag for 1 meter.		
2.	1	cos102066_50cm	**Microgate OptoGait® Kit 0,5 m for extension** Content: 1 x TX, 1 x RX bar 50 cm with 2 connection plugs for extensions (without bag)		
3.	2	cos103386	**Optofix® mounting kit** Holder system with magnets for OptoGait® bar to mount it on h/p/cosmos treadmill (not for extra wide footboards). This set consists of 4 fastening profiles.		
4.	1	cos10075	**transport / shipping charge**		
			total price net, excluding VAT, excluding custom duties		
			VAT (19 % in Germany, other VAT and/or custom duties may apply in other countries)		
			system price h/p/cosmos solution for gait training: please ask your dealer for a quotation		

configuration microgate optogait®: gait/running analytics professional

recommended configuration retrofit gait / running analysis for treadmills with a running deck size of 250 x 75 cm - 300 x 125 cm

pos.	qty.	order number	product description		
1.	1	cos102065	**Microgate OptoGait® Kit 1 single metre** Content: 1xTX, 1xRX bar with interface, 2 webcams, 2 tripods, USB cable, power supply, software, bag for 1 meter.		
2.	1	cos102066	**Microgate OptoGait® Kit 1 m for extension** Content: 1 x TX, 1 x RX bar 1.0 m with 2 connection plugs for extensions (without bag)		
3.	2	cos103386	**Optofix® mounting kit** Holder system with magnets for OptoGait® bar to mount it on h/p/cosmos treadmill (not for extra wide footboards). This set consists of 4 fastening profiles.		
4.	1	cos10075	**transport / shipping charge**		
			total price net, excluding VAT, excluding custom duties		
			VAT (19 % in Germany, other VAT and/or custom duties may apply in other countries)		
			system price h/p/cosmos solution for gait training: please ask your dealer for a quotation		

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configuration quasar® med: gait analysis standard zebris

recommended configuration gait analysis zebris standard quasar® med

pos.	qty.	order number	product description		
1.	1	cos30003va20	**h/p/cosmos treadmill quasar® med MCU5** running surface 170 x 65 cm, speed range 0 ... 25 km/h, elevation 0 ... 28 %, control via UserTerminal MCU5 with keyboard and display, integrated interface or via optional remote control		
2.	1	cos10181-03	**Reverse belt rotation (downhill),** incl. belt centering rolls, max. reverse speed: 5 km/h, with safety arch: 25 km/h		
3.	1	cos102292	**zebris FDM pressure measuring platform 2i upgrade** for running deck 170 x 65 cm, without treadmill option pressure distribution platform 132.1 x 55.9 cm, 4.576 sensors, 120 Hz, price only valid for initial fitting-out, incl. software zebris FDM for gait analysis		
4.	1	cos100385i	**zebris SyncCam HS** (camera without tripod), video camera 60 Hz, video camera 60 fps Full HD (1920x1080), 90 fps HD (1920x720), 120fps VGA (640x480)		
5.	1	cos100385b	**zebris stand for SyncCam or SyncLightCam** (mobile) mobile stand for SyncCam and SyncLightCam with integrated cable fixation		
6.	1	cos100384	**zebris FDM-Stance module** extra software module for stance & balance analysis for instrumented biomechanic treadmill or platform stand alone		
7.	1	cos10079-01va02	**Safety arch 65** with harness & chest belt / stop function, fall protection for all applications (mandatory for high risk applications); running surface 65 cm wide		
8.	1	cos14903-04-S	**Chestbelt S** for safety arch system, colour code: red, for chest measurement approx. 65-95 cm		
9.	1	cos14903-04-L	**Chestbelt L** for safety arch system, colour code: yellow, for chest measurement approx. 105-135 cm		
10.	1	cos14970-03	**h/p/cosmos satellite PC med** DELL PC, 2x 24" LCD Monitor, COL Laser printer, potential isolation transformer, h/p/cosmos PC-rack with 4 casters		
11.	1	cos102397	**LCD monitor TV 50" (with a small monitor stand for table)** for example for SpeedLab®, gaitway® display or for the zebris virtual training module		
12.	1	cos101624	**Monitor stand mobile for LCD TV 32-60"** monitor stand (without monitor!) for additional TV / monitor (max. load: 30 kg), height: 180 cm.		
13.	1	cos12769-01	**USB to RS232 converter** converter from USB to serial port RS232 (Sub-D 9-pin male)		
14.	1	cos102522va04	**Packing treadmill 150/50**, fully assembled with cardboard hood (L: 230 cm / W: 109 cm / H: 169 cm)		
15.	1	cos60098010021	**transport / shipping charge** (please specify if truck, sea or air freight; for overseas sea shipment is recommended)		
16.	1	cos10194	**installation, commissioning and instruction** through authorised and trained personnel		
17.	1	cos101094	**1-day application workshop**, includes costs for specialist / referent. Not including flight, logistics, hotel, etc.		
			total price net, excluding VAT, excluding custom duties		
			VAT (19 % in Germany, other VAT and/or custom duties may apply in other countries)		
			system price h/p/cosmos solution for gait training: please ask your dealer for a quotation		

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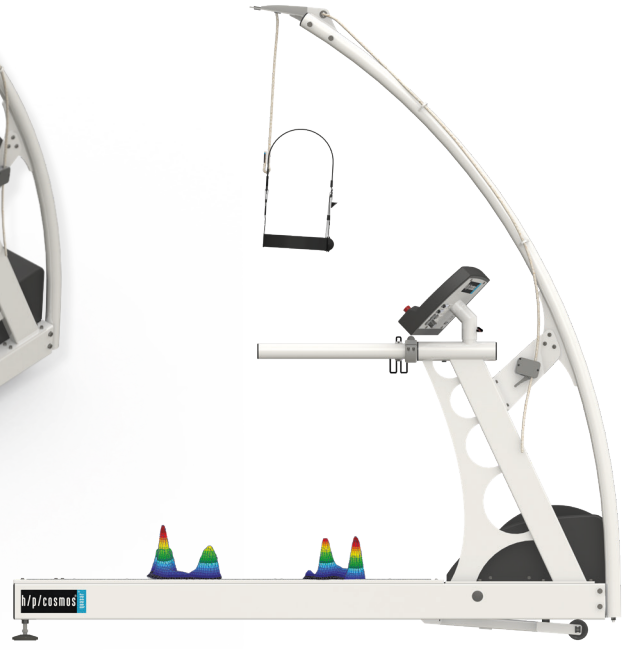
h/p/cosmos sattelite PC med [cos14970-03]

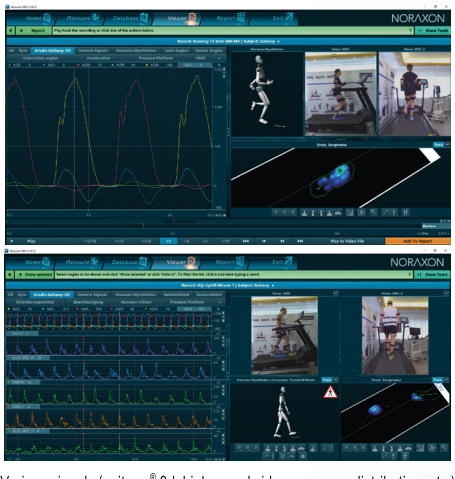


system solution biomechanics gaitway® 3d „force meets pressure advanced"

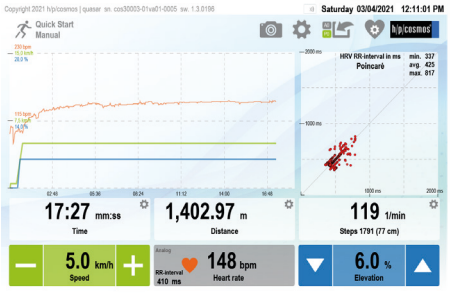
the combination of gaitway® 3d force measurement and pressure distribution

biomechanics for scientific
and industrial research
gaitway® 3d 170 x 65 cm

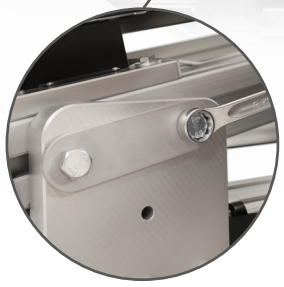
Fully removable handrails and terminal allow maximum visibilty for motion capturing or video analysis.
For any application without handrails, a fall prevention system is mandatory.



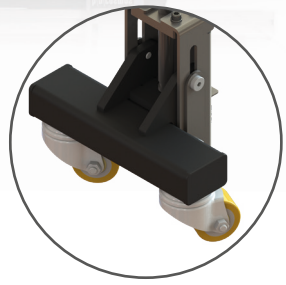
Various signals (gaitway® 3d, high speed video, pressure distribution, etc.)
can be gathered live and recorded in Noraxon MR3 software.



MCU6 Screenshot with parameters also including HRV (heart rate variability)
in chatter diagram and step count, step length and step frequency.



eight reinforced fixations during elevation mode enable
utmost stability and excellent force data quality



retractable transportation wheels
allow flexible relocation of
the gaitway® 3d if neccessary

system solution biomechanics gaitway® 3d „force meets pressure advanced"

recommended configuration **biomechanics for scientific and industrial research** gaitway® 3d 170 x 65 cm
further application specific recommendations, configurations and sizes on request

pos.	qty.	order number	product description		
1.	1	cos30003-01va05	**h/p/cosmos treadmill stellar® MCU6** running surface 170 x 65 cm, speed range 0 ... 25 km/h, elevation 0 % (optional 28%), 10.1" TouchScreen with Windows 10, RS232 com1 interface, USB, LAN, para control® software		
2.	1	cos102999_ 170-65_MCU6	gaitway® 3d biomechanics upgrade 3 component (Fx, Fy, Fz) force measurement		
3.	1	cos102999_XXX-65elevva02	Elevation 0% to +20% for gaitway® 3d 170 x 65 cm 0 ... 20.0 % (0 ... 11.3°) motorized adjustment (-20 % ... +20 % when using optional reverse belt rotation) for treadmill 170 x 65 cm		
4.	1	cos103971	retractable transportation wheels (4x) for gaitway® 3d 170 x 65 cm		
5.	1	cos103975	special speed 0 ... 30 km/h, 0 ... 8.33 m/sec (0 ... 18.64 mph)		
6.	1	cos103815	Reverse belt rotation (downhill) 170 x 65 cm with MCU 6 TouchScreen for models with running surface 170 x 65 cm, incl. belt centering rolls, max. reverse speed: 5 km/h, with safety arch: 25 km/h		
7.	1	cos103019	Special matt design for motion analysis frame colour RAL 9005 deep black (powder coated, non-shiny) to reduce reflections on the treadmill frame		
8.	1	cos10079-01va02	Safety arch 65 with harness & chest belt / stop function fall protection for all applications (mandatory for high risk applications); running surface 65 cm wide. Including chest belt size M		
9.	1	cos14903-04-S	chest belt for safety arch, size S (chest measurement: 65-95 cm), colour code red		
10	1	cos14903-04-L	chest belt for safety arch, size L (chest measurement: 105-135 cm), colour code yellow		
11.	1	cos14903-04-XL	chest belt for safety arch, size XL (chest measurement: 125-155 cm), colour code green		
12.	1	cos102293va02	zebris FDM pressure measuring platform 3i, upgrade for running deck 170 x 65 cm, without treadmill option pressure distribution platform 135.5 x 54.1 cm, 10.240 sensors, 120 Hz, price only valid for initial fitting-out, incl. software zebris FDM for gait analysis		
13.	1	cos101734	zebris modular extension with 180 Hz for running deck 170 x 65 cm extension (must be ordered with the treadmill!) from standard 120 Hz by further 180 Hz to 300 Hz sampling rate in total		
14.	1	cos102999ip_set-01	Soft-& hardware set „ Noraxon Package 3D Force und Pressure Treadmill". Integration package for h/p/cosmos gaitway® 3d: Treadmill and zebris pressure distribution measuring plate have to be ordered separately at extra cost. The software combines several sensors and provides a visual representation of the force superposition. incl. 2x High-speed color video cameras and 1x MYO synchronisation module, 1x zebris-Noraxon sync cabel, 1x BNC-3.5mm audio adapter		
15.	1	cos102999ds	Digital data streaming interface module, control from a third-party application with data streaming option. Seamless integration with other biomechanical measuring systems, such as motion analysis system, motion sensors, EMG, pressure distribution sensors, video software, etc.		
16.	1	cos14970-03	h/p/cosmos satellite PC med DELL PC, 2x 24" LCD Monitor, COL Laser printer, potential isolation transformer, h/p/cosmos PC-rack with 4 casters		
17.	1	cos12769-01	USB to RS232 converter, converter from USB to serial port RS232 (Sub-D 9-pin male)		
18.	1	cos102999pert_MCU6	Perturbation option for gaitway® 3d		
19.	1	cos10177	Packing treadmill 170&190 x 65 cm (SA), part assembled, packed part assembled on pallet with cardboard hood, incl. safety arch		
20.	1	cos16631	transport treadmill 170&190 x 65 cm (within Germany, Export on request)		
21.	1	cos102999inst-eu	Installation gaitway® 3d EU within EU, Installation onsite at customer´s facility, gaitway® 3D will be bolted to the floor. Incl. traveling, hotel, labour costs and 4 hours training		
22.	1	cos101094	1 day workshop (in Export: virtual/remote training)		
			total price net, excluding VAT, excluding shipping, EXW., excluding custom duties		
			VAT (19 % in Germany, other VAT and/or custom duties may apply in other countries)		
			system price h/p/cosmos solution for gait rehabilitation: please ask your dealer for a quotation		

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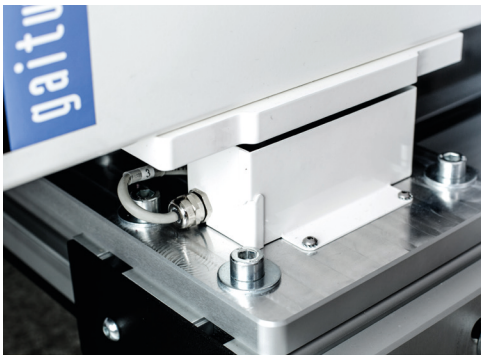
The perturbation mode called „shake" will allow sudden speed changes to simulate slips and trips on h/p/cosmos MCU6 treadmills.

specifications h/p/cosmos gaitway® 3d modification

manufacturer:	h/p/cosmos sports & medical gmbh / Germany
order number:	cos30000-02va09 (treadmill stratos® sport) cos102999_150-50_G6 cos30003-01va05 (treadmill stellar® sport) cos102999_170-65_MCU6 cos30004va04 (treadmill pulsar® 3p 190 x 65 cm) cos102999_190-65 Medical versions on request. For medical versions please allow longer delivery times.
running surface:	L: 150 cm W: 50 cm L: 170 cm W: 65 cm L: 190 cm W: 65 cm
speed range:	stratos® sport: 0 ... 22.0 km/h stellar® sport: 0 ... 25.0 km/h pulsar® 3p sport: 0 ... 40.0 km/h (optional up to 45.0 km/h)
elevation:	optional electr. adjustable and fixed at up to 20%
classification:	scientifically instrumented device; medical and therapeutic applications on request
load range on sensors Fx, Fy, Fz:	10 kN
overload (sensors):	24 kN
non-linearity Fx, Fy: Fz:	 < 0.8 % < 0.2 %
hysteresis Fx, Fy: Fz:	 < 0.8 % < 0.2 %
cross-talk Fz → Fx, Fy:	 < 1.0 %
drift Fx, Fy, Fz:	 < 0.05 N/min
natural frequency 150 x 50 cm: 170 x 65 cm: 190 x 65 cm:	(depending on configuration - values below unloaded, fixed to floor) 45 / 60 / 60 Hz (Fz, Fy, Fx) 40 / 55 / 55 Hz (Fz, Fy, Fx) 35 / 45 / 45 Hz (Fz, Fy, Fx)
interfaces:	Built-in amplifier with ethernet interface, analog force and speed output, digital start and stop trigger, treadmill interfaces depending on model serial port RS232 for treadmill control via coscom v3 interface
accessories (extra charge):	safety arch fall stop [cos10079-01] for 150 x 50 cm safety arch fall stop [cos10170-01] for 170 & 190 x 65 cm science port for raw speed data [cos101277] special speeds pedending on treadmill models special speed 0 - 10 km/h 150 x 50 cm [cos10000] special speed 0 - 25 km/h 190 x 65 cm-3p [cos12995p3p] special speed 0 - 45 km/h 190 x 65 cm-3p [cos10159va06] non-reflecting powder coating [cos102465ralxxxx] NORAXON EMG software, video cameras & IMUs Perturbation [cos102999pert_MCU6] digital interfaces for Qualisys, Vicon, etc. Zebris FDM upgrade 3d motion capture systems
temperature operation temperature storage:	10 ... 40 °C -25 ... 40 °C
operating humidity storage humidity:	30 ... 70 % (non condensing) 0 ... 95 % (non condensing)
air pressure:	700 ... 1,060 hPa (max 3000m altitude)
audible noise:	noise emission LpA < 70 dB(A) (63dB) acc. EN957-6
resolution:	adjustable (12-375 mN/bit)
sampling rate:	adjustable (100-10,000 Hz)



example specifications stellar® sport (MCU6) [basic treadmill model before gaitway® 3d modification]

treadmill model:	**stellar® sport**
manufacturer:	h/p/cosmos sports & medical gmbh / Germany
order number:	cos30003-01va05
applications:	endurance training walking and running
control:	via UserTerminal MCU6 with keyboard, touch display and Windows® 10 operating system, integrated interface coscom v4
keyboard:	9 keys for manual control, easily controllable with medical gloves and under sweaty conditions
running surface:	L: 170 cm (5ft 6.9") B: 65 cm (2ft 1.6") access height: 23 cm (9.06"), for gaitway height depends on installation. - shock load reduction for the joints - running belt with slip resistant surface - reinforced running belt with profiled surface, 5 mm thick - max. permissible load: 300 kg (660 lbs)
speed range:	0 ... 25.0 km/h (0 ... 6.9 m/s) (0 ... 15.5 mph) special speed available at extra charge: 0 ... 10 km/h (0...6.2 mph)
acceleration:	7 acceleration / deceleration levels between 131 s and 3 s from 0 to max. or from max. to 0; equals 0.053 ... 2.315 m/s² programmable via para control® PC software
elevation:	0 % (elevation optional on request)
running direction:	option for reversing running belt direction at extra charge, max. permissible reverse speed 5 km/h (3.1 mph) if no safety-harness with fall-stop prevention system is used
motor systems:	3.3 kW (4.5 HP) 3-phase AC motor, maintenance free and brushless; 20 years warranty on main drive motor. For high-performance applications, we recommend models with a 3-phase 3x400 volt power supply and a running surface min. 190 x 65 cm.
power transmission:	frequency inverter, poly-V-belt, very quiet operation
safety systems:	CE; machinery directive 2006/42/EC; EN 60335-1; EN 60601-1-2 (EMC tested); ISO 20957-1; EN 957-6; EN 14971; emergency-stop mushroom push button (drives power off) emergency-stop with pull-cord and clip
degree of protection:	appliance class I ⏚ / IP 20
classification:	sports and fitness device; not for medical, not for therapeutic applications.
usage class:	S, I according to ISO 20957-1
accuracy class:	A (high accuracy) according to EN 957-6
earth leakage current:	< 2.0 mA
ambient condition:	temperature: +10...+40 °C (-30...+50 °C on request) humidity: 30...70 % (up to 100 % on request) air pressure: 700...1060 hPa; 3,000 m (~10,000 ft) max. altitude without pressurization
display (resolutions) paramter:	25.9 cm/10.1" (1280x800), color touch display parameter: speed, time, elevation, distance, METS, energy consumption, altitude, power, pace, heart rate, heart rate variability (digital and scatter diagram), diagram view of heart rate and load parameter parameter export to .pdf and .csv tables to USB
resolution:	1 decimal place
units:	metric / imperial
heart rate monitoring:	pulse receiver incorporated (analogue 5kHz + digital Bluetooth®), incl. chest belt POLAR® H10, automatic control of speed and elevation according to programmed target heart rate („cardio mode")
digital interface:	RFID / NFC® Reader (optional at extra charge) 4x USB 2.0 (1x USB 3.0 internal) Bluetooth®, WiFi / WLAN (optional at extra charge) 1x LAN / RJ45, 1x HDMI connection 1x RS232, 1x connection for safety arch fall st op
programs:	18 programs / profiles (predefined) - 8 exercise profiles (scalable) - 10 test profiles (UKK 2 km Walktest, Conconi, Graded test, Naughton, Ellestad, Cooper, Balke, etc.) - min. 100 free definable programs import / export of profiles from / to USB stick also for further processing

PC software (incl.):	h/p/cosmos para control® for display & remote control
accessory (incl.):	instruction for use on USB stick, drinking bottle holder, service box, special oil, PE potential equalization cable POLAR® H10 heart rate chest belt (Bluetooth® + 5 kHz)
colour of frame:	pure white RAL 9010 (powder coated)
handrails:	steel tube handrails Ø 60 mm on both sides, over min. 1/3 of treadmill length with front-handrail crossbar other handrail designs at extra charge
voltage supply:	230 Volt AC 1~/N/PE 50/60 Hz 15 ... 16A fuse; dedicated circuit, line and protection;
size of frame:	L: 230 cm (7ft 6.6") W: 105 cm (3ft 5.3") H: 149 cm (4ft 10.7")
net. weight:	device approx. 282 kg (621 lbs)
gross weight:	approx. 500 ... 550 kg (1102 ... 1212 lbs)

Optionally available at extra charge are special frame colours, other handrail designs, special voltage supply and other options and accessories. Weight and package specifications can deviate according to options, accessories packing and way of transport. E&OE. Subject to alterations without prior notice. Please consider the natural and physical performance limitations of the single phase 230 volt power supply. The single phase 230 volt power supply is sufficient up to normal fitness or therapy applications. For all special high performance applications (speed running, controlled jump-ons, sidesteps, heavy subjects at higher speed, extreme elevations, etc.), we recommended models with a 3-phase, 3x400 volt power supply (for example model h/p/cosmos quasar med 3p, pulsar 3p, venus or saturn).

Warning! Installation, commissioning, instruction, maintenance and repair work only to be conducted by h/p/cosmos trained and authorized personnel. For treadmills with oversized deck (width >65cm), for children, special applications, without sufficient safety space behind the treadmill, for subjects and / or patients with health or other limitations (e.g. visual impairment, etc.), for running at high speed and / or for all individuals, where a fall triggers a dangerous risk of injury or death (e.g. newly operated hip patients, invasive probes, etc.), a fall prevention system is obligatory (e.g. safety arch with chest belt and harness or a weight support system). For more information see the instructions for use. Safety space behind the treadmill: min. L: 2 m (6ft 6.74") x treadmill width. Children are only allowed to be on the treadmill, if under permanent supervision and secured by a fall prevention system.

Complete h/p/cosmos comparison matrix for walking / running parameters and features in biomechanics

	Gait parameters	Optogait®	Zebris FDM-T	gaitway® 3d	gaitway® 3d & Zebris FDM-T
software	separate report for walking or running	●	●	●	●
	automatic walking or running detection			●	●
	biofeedback	●	●	●	●
	treadmill control speed / incline			●	●
geometry	step length	●	●	●	●
	stride length	●	●	●	●
	step width		●	●	●
	foot rotation angle		●		●
phases in %	stance, swing, single support, total double support (walking), load response, pre-swing	●	●		●
time	step time	●	●	●	●
	contact time	●		●	●
	flight time (running)	●		●	●
	cadence	●	●	●	●
	gait cycle	●	●	●	●
	double support time (walking)			●	●
	single support time			●	●
speed	target speed	●	●	●	●
	raw treadmill speed			●	●
pressure	pressure plots		●		●
	forefoot / backfoot loading symmetry		●		●
	left / right loading symmetry		●	●	●
	3 foot zone analysis		●		●
	7 foot zone analysis		●		●
COP	Butterfly diagram, geometrics, gait lines		●	●	●
Force curves	vertical Fz		●	●	●
	medio-lateral Fx			●	●
	anterior-posterior Fy			●	●
Moments	Tz free moment (in horizontal plane)			●	●
Fz curve charcteristics	standard Fz parameters (walking): loading peak, time to loading peak, push-off peak, time to push-off peak		●	●	●
	advanced Fz parameters: vertical impulse, loading rate, mid-support force (walking), time to mid-support (walking), active peak force (running), time to active peak force (running), push-off rate, loading / push-off ratio			●	●
Fy curve charcteristics	breaking impulse, breaking peak force, time to breaking peak, time to breaking propulsive transition, propulsive impulse, propulsive peak force, time to propulsive peak force			●	●
Fx curve charcteristics	lateral strike impulsive, peak force, push impulse, push peak force			●	●
others	specials: duty factor, leg stiffness, walking ratio			●	●
	COM displacement vertical / fore-aft, lateral; COM path			●	●
	mech. work recovery, total, vertical, fore-aft, lateral			●	●
	Mx, My, Mz torque around the origin			●	●
synchronisation	sync in / out		●	●	●
	trigger out	●		●	●
	Aux. In			●	●
frequency	sampling rate	1.000 Hz	100-300 Hz depending on system	10.000 Hz adjustable	force: 10.000 Hz adjustable pressure: 100-300 Hz depending on system

Your project notes:

sports / athletics

sports
quasar® MCU6

cycling & athletics
saturn® 300/100r

performance diagnostics
pulsar® 3p

inline skating
saturn® 300/125r

functional training
pulsar® 3p / robowalk®

cross country skiing
skating / biathlon
saturn® 450/300rs

wheelchair
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