



The basic units of the IsoMed 2000 series



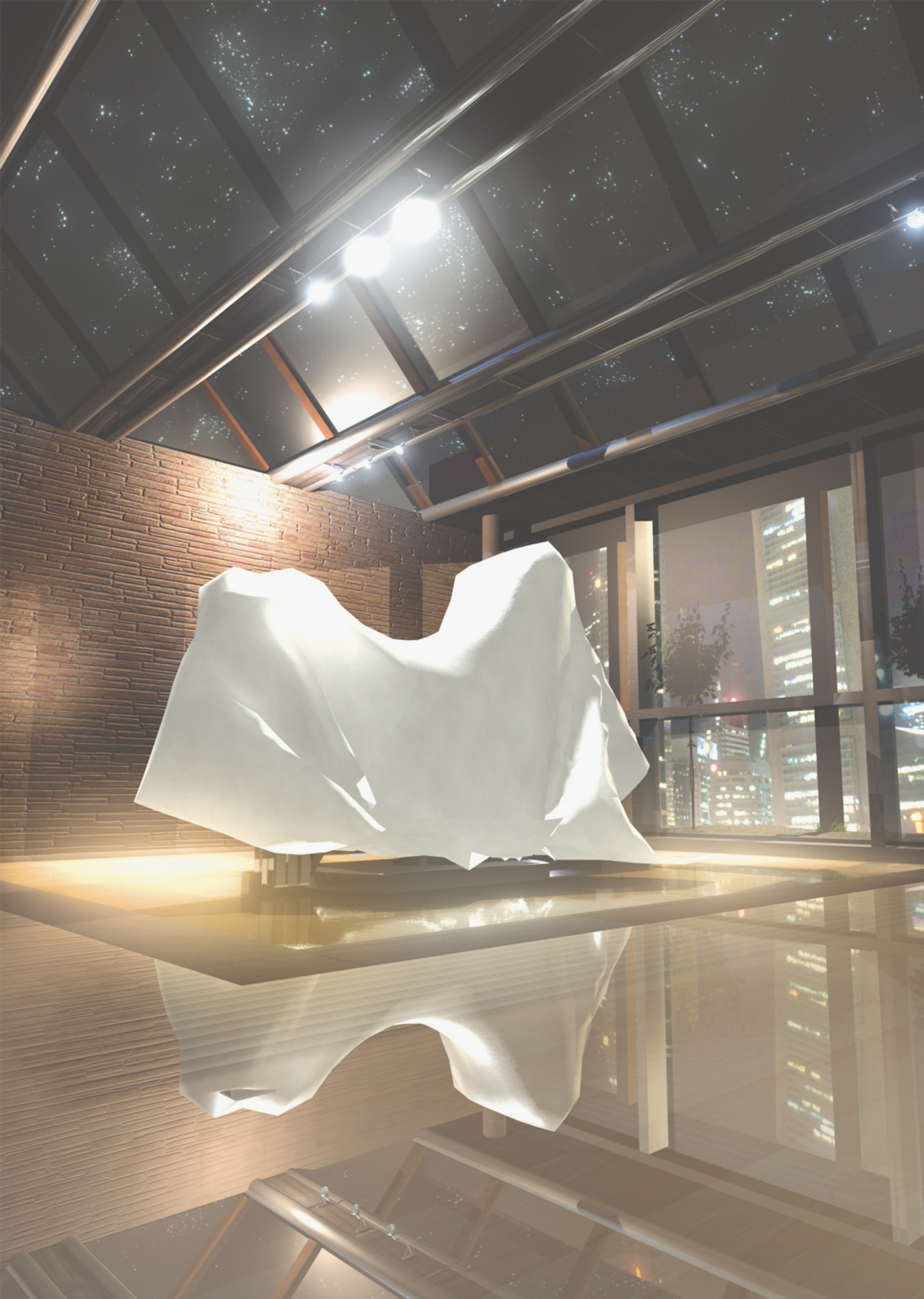




Ideas won't keep. Something must be done about them.

*(Alfred Whitehead - Mathematician and Philosopher)*







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# The History of an Idea

We are very pleased you are interested in products from our IsoMed 2000 series!

Back in 1986, the first idea came to build a sophisticated Isokinetics system. A system inspired by innovation and high quality which is easy to handle and truly customer-oriented.

A lot has changed in our products since then, of course. Today we can offer you an IsoMed 2000 system which features technical innovations like WLAN and DIRECT VIEW, unique accessory machines and much more.

Our machines can be found in rehabilitation and medical centres, universities, German Olympic Training Centres, professional sports clubs, world-class sporting facilities, research institutes and other renowned venues all over the world. Thanks to these high quality locations our equipment is used by top professionals, helping us to continuously improve its performance.

With the help of this presentation you will be able to judge for yourself whether we have been successful in striking a balance between technical innovation and maximum handling comfort to meet your requirements.

IsoMed 2000 - a great idea in pictures





## Where would you like to have it?

That's right. - At first the IsoMed does appear somewhat bulky. But its sturdy bodywork is complemented by easy handling and minimal working space requirements. Exquisite materials like anodised aluminium or glass-beaded stainless steel provide a perfect finish, blend in smoothly with your existing equipment and make IsoMed the focus even of an exclusive hotel's fitness centre.

Due to its sturdiness and much to our regret you will hardly ever have to enlist the assistance of our friendly service and maintenance team.



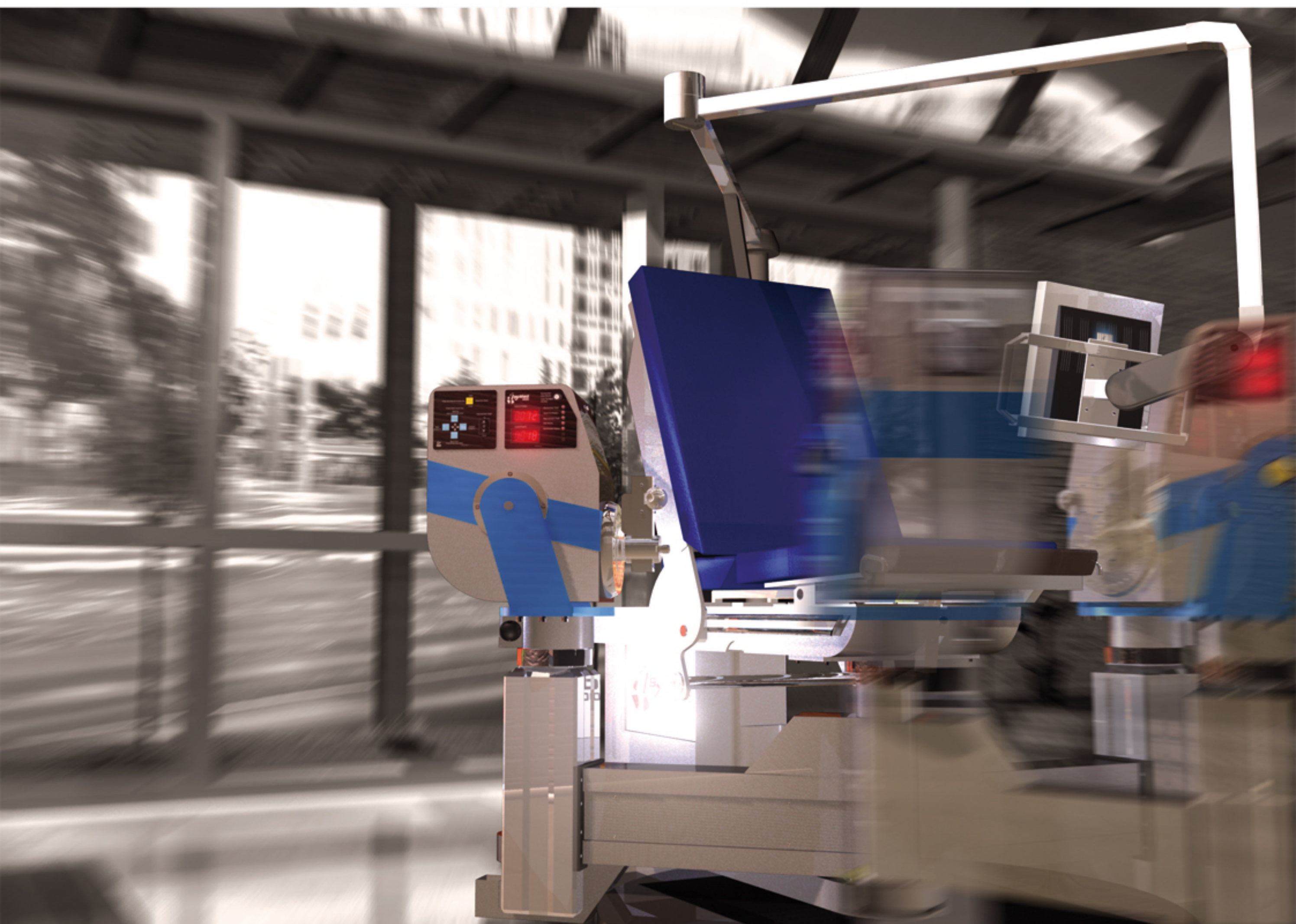


## Convenient? Versatile?

IsoMed will offer you a full range of exercises and superior individual adaptability hard to be found in any other system. This is due to clever design solutions like knee, shoulder or wrist adapters, a fully adjustable leg rest, diverse support pads or *CONNECT PLUS* used to connect external modules as well as a seating system which can be turned into a completely flat table.

For a good night's rest, though, you will still want your bed.



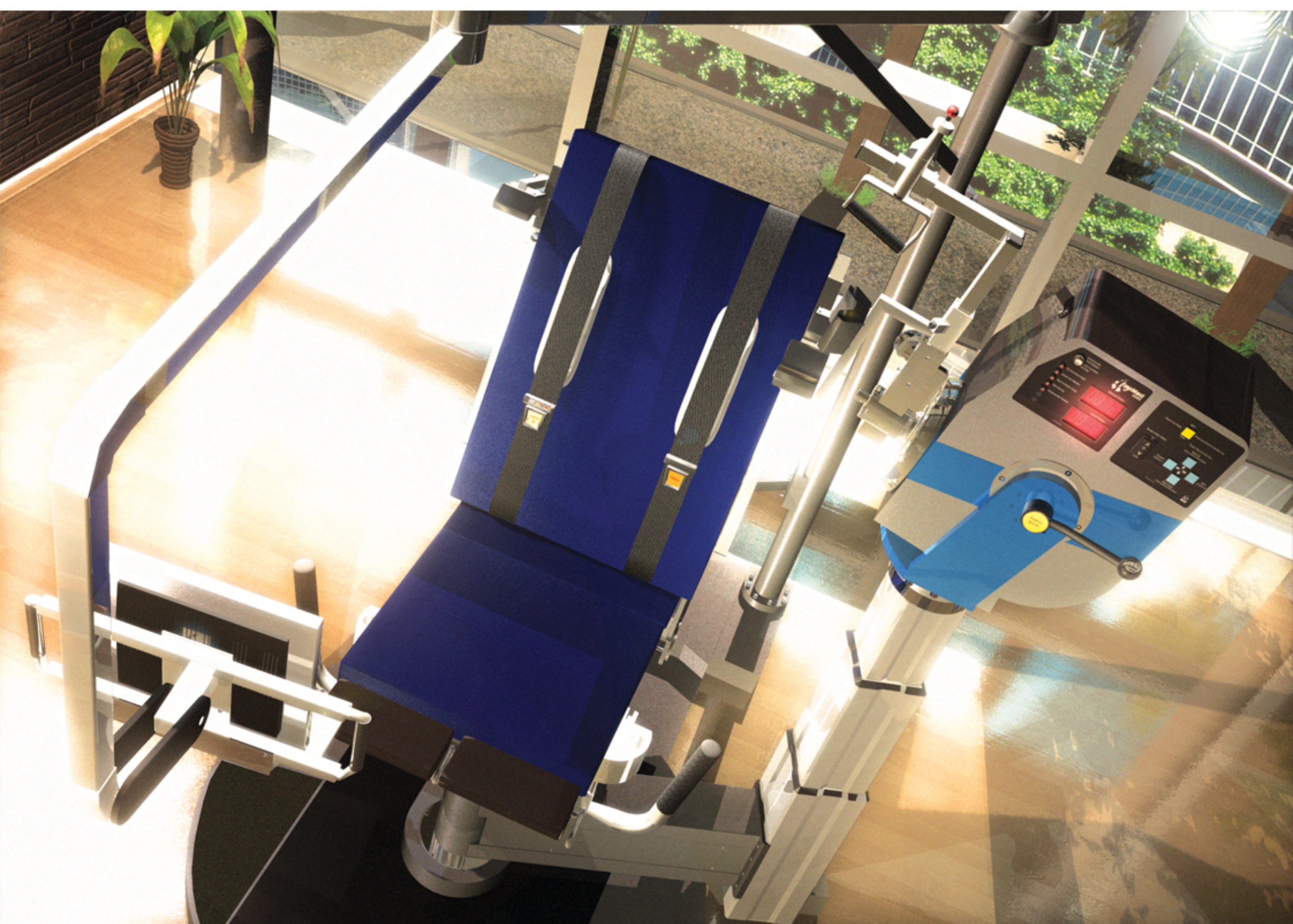


## Time flies!

Every minute counts these days. Time presses. The span of time you can devote for your test person is ever shorter. The IsoMed system tries to ease your work by using unique innovations such as the automation of all settings according to the test person's data (*MEMOTRONIC*). This will give you important minutes you otherwise would have lost on time-consuming adaptations.

Just don't let yourself get carried away by all those functionalities running independently. Your test person is still around!





## Aiming high?

Your IsoMed will gladly assist you. The operating range of the extension arm as well as of the dynamometer head is unrivalled. If you should still need more though, you can electrically lift the whole head by another 60 cm (to a total height of 160 cm) with undiminished stability, of course. So you are prepared for even the most extreme exercises, e.g. in a standing position.

Which does not mean you will have to place your IsoMed under the open sky. So far, there has always been enough room for its 2.18 m overall height.

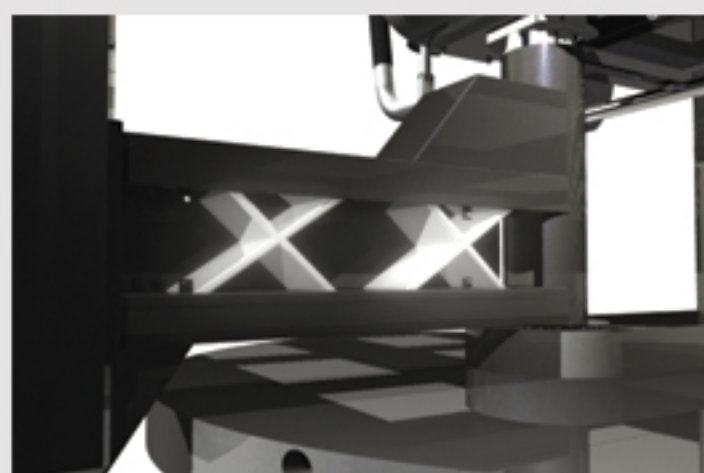


## Characteristics

The strongest way of fixing equipment is to anchor it in cast concrete. However, the IsoMed 2000 is just every bit as rugged. And there is a solid reason: a sophisticated and well thought-out steel structure ensures matchless stability at high liberty of action even on delicate surfaces.

### **Basic design**

The IsoMed 2000 series offers striking movability despite its massive structure. We call this „intelligent stability“ and we put it into practice by fitting reinforcements only where they are statically required. This principle works so well that our swivel arm will not twist by a single centimetre even when the lifting columns are fully extended (~160cm) under full load. What is more, this extremely sturdy workmanship will ensure a long and carefree working life of our equipment.



### **Capacity**

Resistance to even the hardest training conditions is critical in equipment of this category. In addition to its sturdy structure IsoMed offers many other exceptional features like mechanical back rest support complementing electronic clamping. Or an electronically controlled high-performance disk brake with a contact pressure of 12 tons to keep the extension arm in place under all circumstances. Just give it a trial! Not even the strongest and most prolific athletes could unsettle the IsoMed so far.

### **Safety first**

We always anticipate the worst. Emergency stop switches are easily accessible. IsoMed 2000 offers electronically controlled safety locks, stable mechanical range limitations, and even a lockable master switch allowing only authorised persons to operate your equipment. Needless to say, the software is constantly kept up-to-date with safety regulations.





D&R's understanding of "beefier" torque quickly becomes clear: torque sensors and gear units tolerating up to 750 Nm give outstanding measuring precision and power reserves in every conceivable situation. At the same time the adjustments is so delicate that athletes and normal patients alike can test their limits.

### **Dynamometer**

Dynamometers starting from 500 Nm output to unparalleled genuine 750 Nm are optional and will be supplied according to your requirements. Due to its highly sophisticated design the whole structure of the dynamometer is exceedingly robust and above all without slackness. This means on the one hand that no sudden and unpleasant lack of resistance will occur when changing direction while on the other hand perfectly accurate and precise measurements will result. This is achieved through stable rotation clamping which, at the touch of a button when the right position is reached, will keep

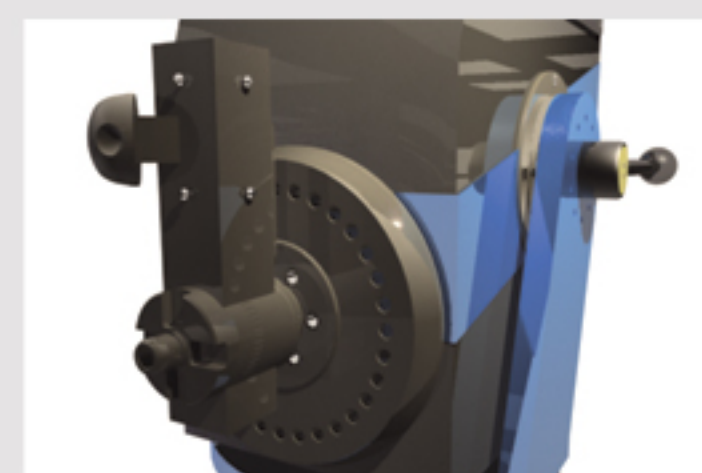
the dynamometer firmly in this position. The whole casing is made from solid steel with a metallic paint finish, built to withstand during long years of hard and constant use.

### **Wear and tear**

The dynamometers in the machines of the IsoMed 2000 series feature a state-of-the-art drive approach with brushless AC servo motors and telemetric signal transmission. Since this approach means there is virtually no wear, you will consequently benefit from very low maintenance costs.

### **Versatility**

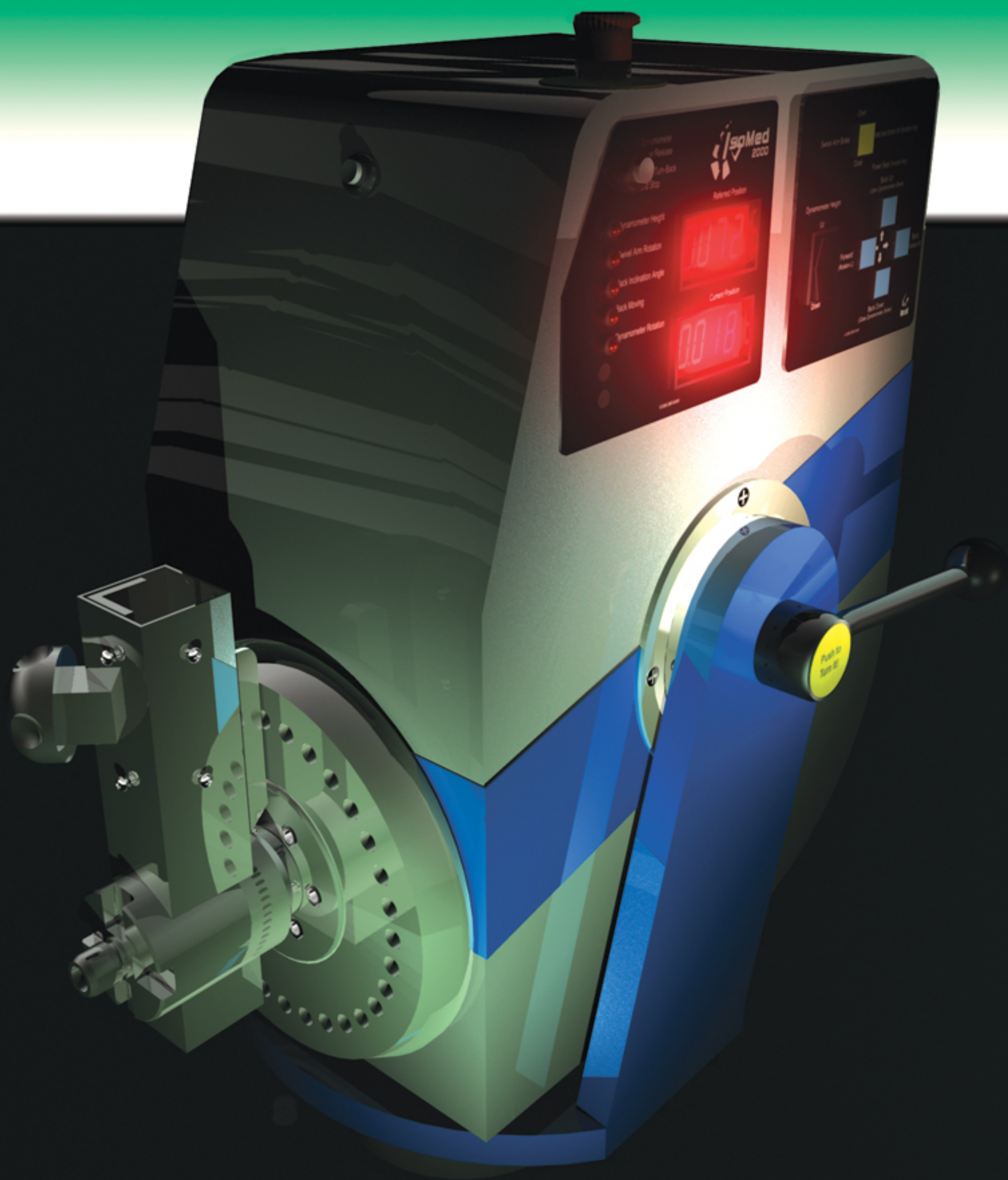
Thanks to a dynamometer shaft which can be swivelled freely by up to 360 degrees no change of adapter is necessary in a direct left-to-right comparison. This saves rather a lot of time in practice.



*Well-defined: Strong LCD displays indicate current positions. The dynamometer shaft can be swivelled freely up to 360 degrees.*

*A state-of-the-art dynamometer >*







Do you still remember the authentic feel of solid metal casing? Or the touch of lavish push switches and the sonorous sound of engaging solid metal components? The IsoMed 2000 series will offer you many opportunities to rediscover these feelings.

### **Ease of use**

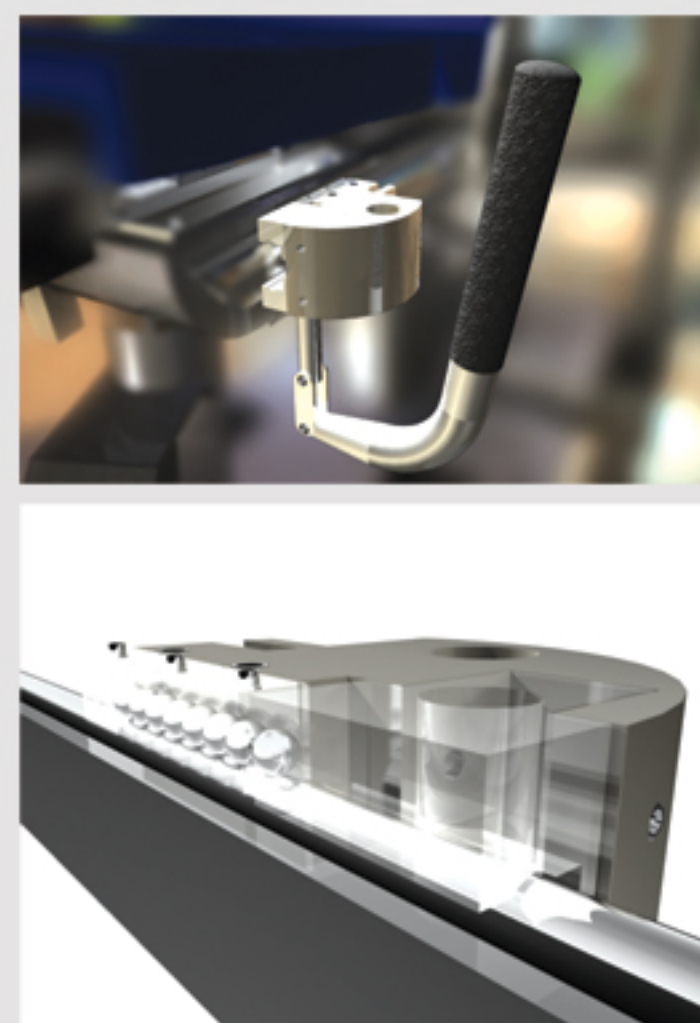
Highly sophisticated products tend to be somewhat difficult to use. The ease with which you can use our isokinetic training system will show you that this is not so by necessity. The individual adaption of IsoMed 2000 to a test person is done directly with control elements on the side of the dynamometer (*DIRECT CONTROL*). Here, you will find electronic keys to adjust the lifting columns, the extension arm and the seat position. If your equipment is supplied with fully automatic control (*MEMOTRONIC*), rotation will be controlled from here as well. Position values determined in this process can easily be read on large displays. Additionally, supplemental LEDs will signal deviations from target positions

and will prompt you to optimise the respective parameters. To us, ergonomics are imperative: While making the individual adjustments, the eyes and hands of the therapist are free to assist the test person, thus contributing to a trustful atmosphere.

### **Quality of use**

All supplementary components used in the IsoMed 2000 series - e.g. the sleds to hold additional adaptors (*SLED SYSTEM*) or the precisely adjustable leg rest - offer high quality handling, combining both precision and swiftness. All components are carefully balanced, sliding without effort and almost automatically into the desired position. The

required quality standards are therefore easily met by a combination of conveniently engaging leg rests, firm hand-holds, well thought-out and effective fastening options and the precise functions offered by the dynamometer.



*SLED SYSTEM*

*DIRECT CONTROL of  
the dynamometer. >*



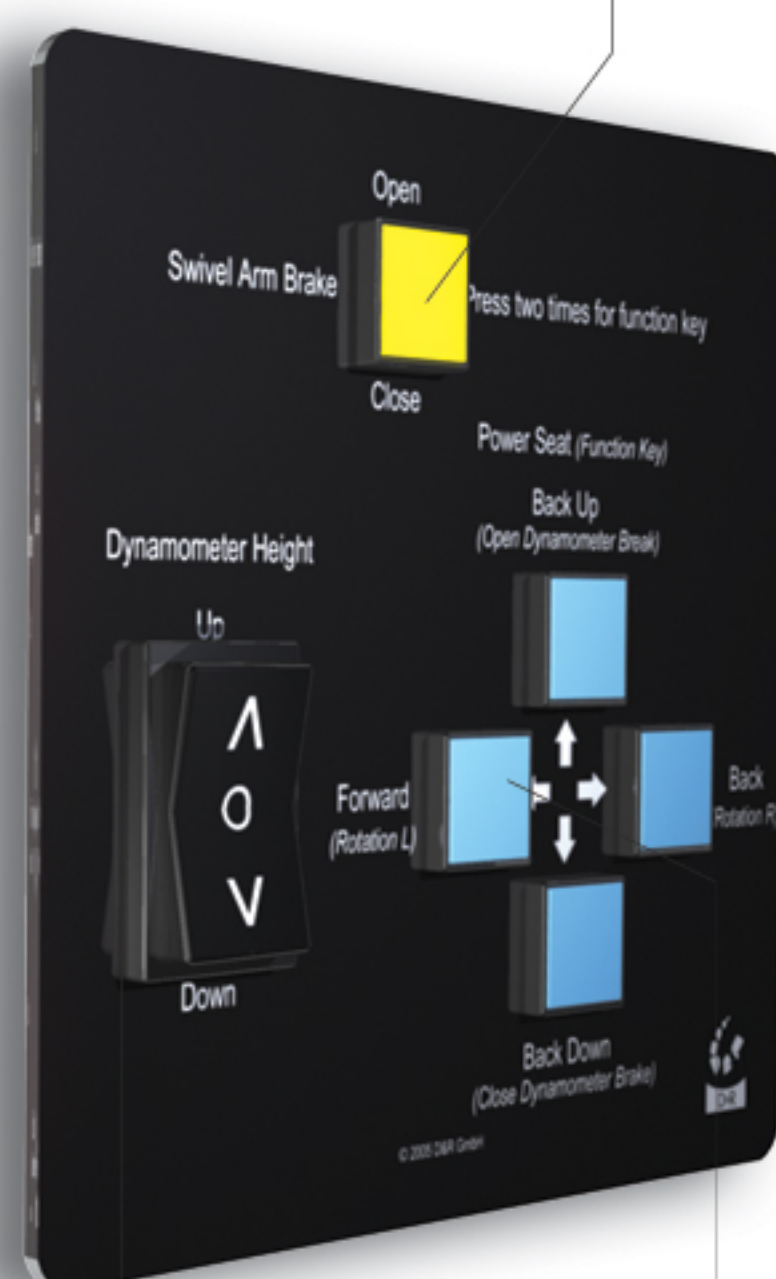
*Unlocking of the dynamometer shaft for fast adjustments or for demonstrations.*



*LEDs signalling the current operation.*

*Two bright displays showing actual and current positions in order to allow accurate positioning.*

*Locking and unlocking of the extension arm brake.*



*Easy control of lifting column height.*

*Four buttons for electronic seat position control - even when the test person is already seated.*



Every large vessel needs a reliable captain who has everything under control, who gives orders to his men and who ensures effective communication on board. The IsoMed series has such a captain, too - in terms of a comprehensive and intuitive software platform, having the huge range of functions easily under control.

### IsoMed Software

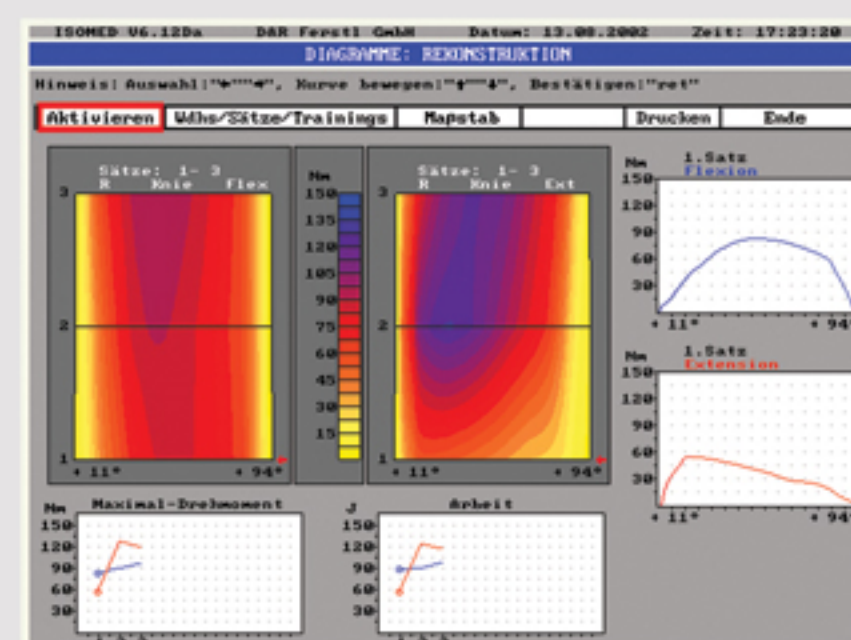
In daily use, the IsoMed Software has to process enormous amounts of data. Our computer experts have decided in favour of an RTOS (Real Time Operating System) for this data to be dealt with in a computer environment allowing fast as well as precise processing. The IsoMed Software therefore runs under DOS, which since long has proven to be extremely reliable and flexible in all kinds of industry world-wide. The range of functions is not impaired in any way by this choice: The software offers automated training sequences, including different training modes with torque control according to joint angle, thus

allowing the controlled increase of training stimuli as well as active gravity compensation, adjustable acceleration and deceleration and motion speeds of up to 2 degrees per second. This, effectively, is three times slower than the second hand of a watch.

### Evaluation

It goes without saying that without proper analysis your data would be virtually meaningless. The software therefore offers an analysis tool allowing you to display and convert any set you want. Additionally, a trend analysis for the therapy is carried out on demand. This can stretch across several sets and sessions to establish a clear trend. Since

our computer experts did not want to do completely without Windows, IsoMed offers you also Windows-based IsoMed *analyze* to analyse and process data.





Expandability, easy handling, sheer range of functionalities and love for detail make the software of IsoMed 2000 a point of action you will enjoy to use. Sadly, it is so quick to handle that you will not spend much time doing so.

## Handling

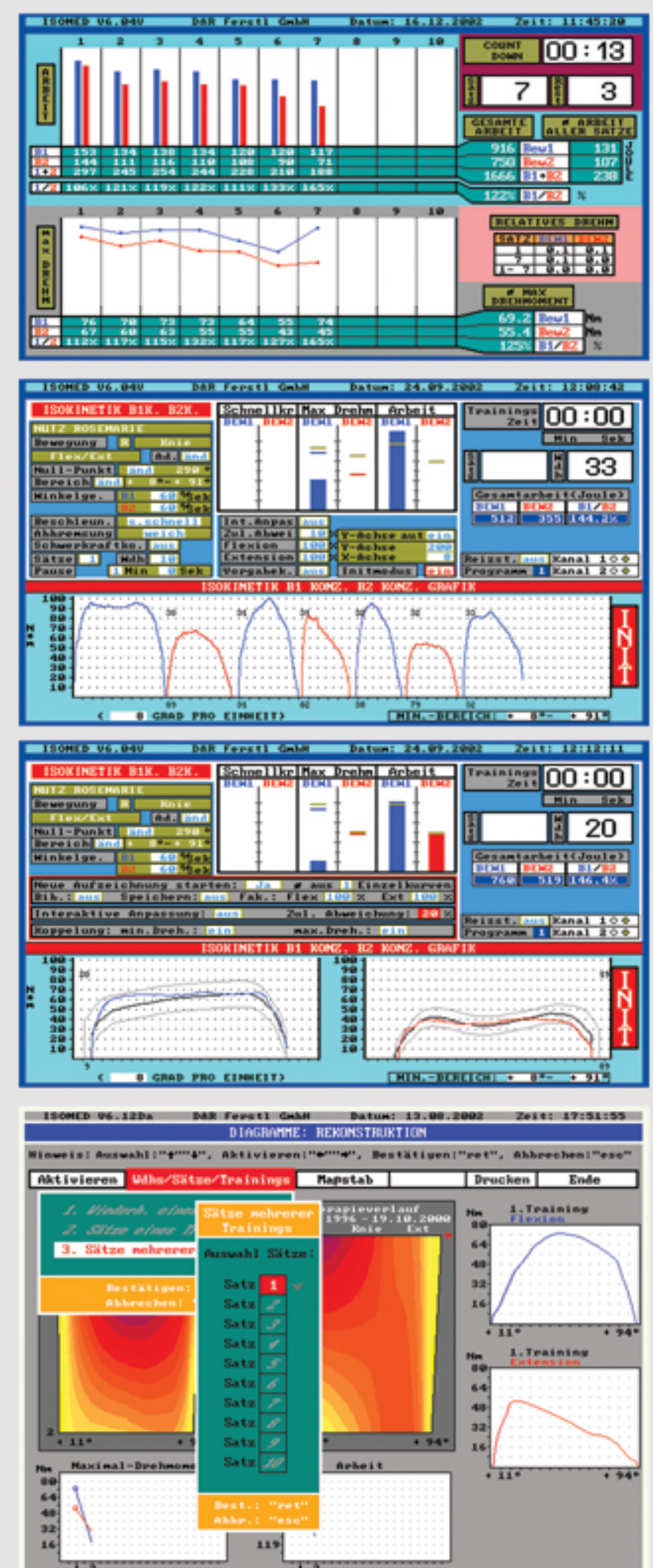
While maybe being a little unfamiliar at first, the software can be operated easily with only a few hotkeys and symbols. This makes it possible to elaborate and start complete trainings in less than a minute.

## In addition

A special feature is the triggering of an external muscle stimulator (EMS). Particular muscle groups can be singled out to be stimulated specifically in a cycle of dynamic movements, while IsoMed 2000 controls each movement.

## Test persons

The basic version of your IsoMed 2000 series already offers extensive test person administration. Not only is the most important anthropometric data of your test person saved here. You also can assign one or several joints to each of your test persons. An integrated database allows you to compile and save preferred training programmes for typical applications in your field of activity.





Everyone enjoys and needs space and freedom to move. Often, though, these are costly extras. The IsoMed 2000 series will give you both as standard. And you certainly will not want to dispense with the concept of *DIRECT VIEW* any more.

### **Mobility**

One of many details that will fascinate you in the IsoMed 2000 system is the serial monitor support arm system called DIRECT VIEW. With its help the test person always has a direct view of the monitor displaying actual performances (Biofeedback). The extraordinary flexibility of its three-dimensional setting allows the test person to keep a natural head position while watching the screen. This avoids tenseness just as well as injuries, in extreme cases. Furthermore, a comfortable body position guarantees reliable measuring results. Needless to say, the monitor

is generously sized. By default, we have installed a 17 inch TFT monitor which provides premium quality pictures.

### **Wireless**

Did you ever trip or stumble over poorly installed wires in daily practice? With equipment from the IsoMed 2000 series this will not happen to you again. Thanks to its monitor support arm and a most compact design of all electronic components only a thin, black tube emerges from the machine. And even that can be placed hidden behind the equipment. This saves you from pushing around inconveniently placed monitors or electric

control boxes which need a vast operating range and yet never find an ideal position for the test person.

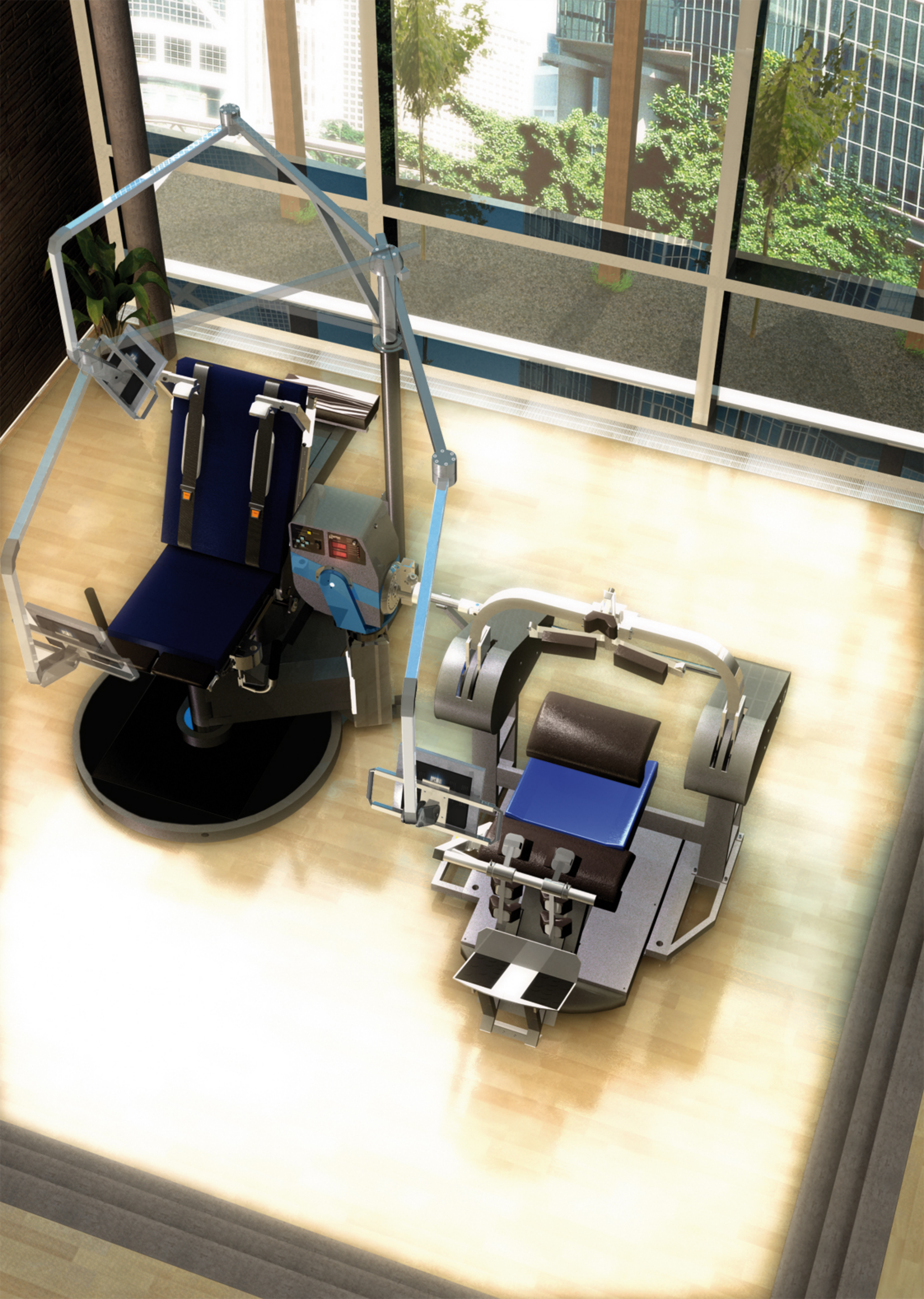
### **Accessory equipment**

The monitor system can be used with all other equipment from the IsoMed system, like the Back Module or the Leg Press, of course.



*The monitor support arm can be moved freely in all three dimensions and functions across the whole IsoMed series.*







## Optional equipment

There is no other comparison for the IsoMed 2000 system but itself. It is the only system on the market which can be fully automatised using **MEMOTRONIC**. A system you will not want to do without any more once you have seen it in practice.

### **MEMOTRONIC**

Generally, our automation can be regarded as a memory functionality which looks at each test person's data and accordingly makes all seat, satellite and dynamometer settings. In practice this means a lot more, though. It means that all times this system will offer you formerly unknown precision and repeatability since your settings are computer controlled by IsoMed and will be re-established every time you start your training. Repositioning therefore is never coincidental and it is fully independent from the users attention.

### **Convenience**

The automation is able to tilt and slide the back rest, to change the satellite radius, the lifting column height and the dynamometer rotation. This excludes possible inaccuracies, saves a lot of time and facilitates the contact between therapist and test person by providing extra time you otherwise would not have had. You can absolutely rely on the precision of the re-positioning, of course.

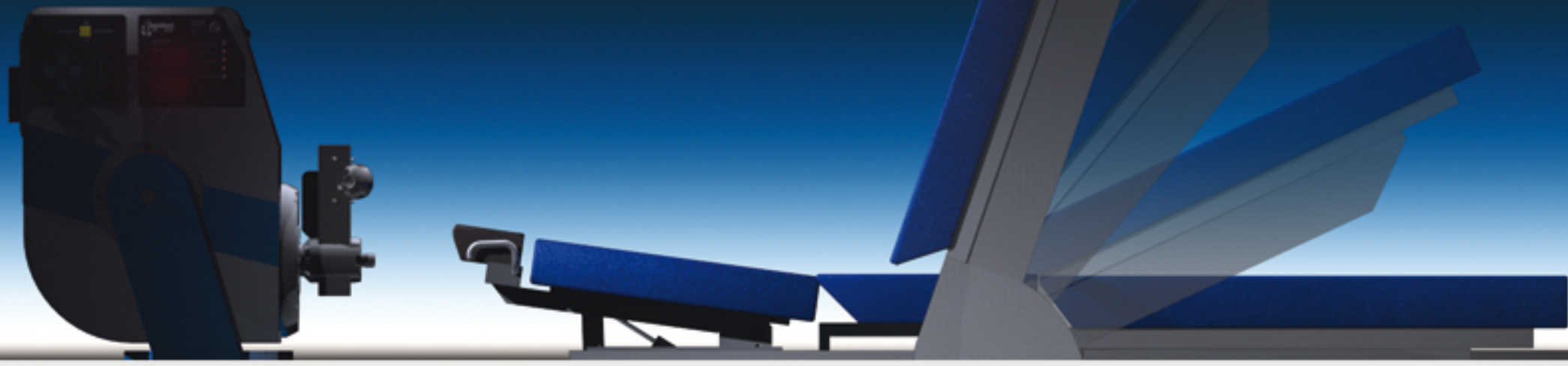
The software will use the already established anthropometric data of the test person in order to support you. This means that even before the first exercise takes place, a potentially adequate position will be

chosen automatically which then only needs to be individually optimized by you.

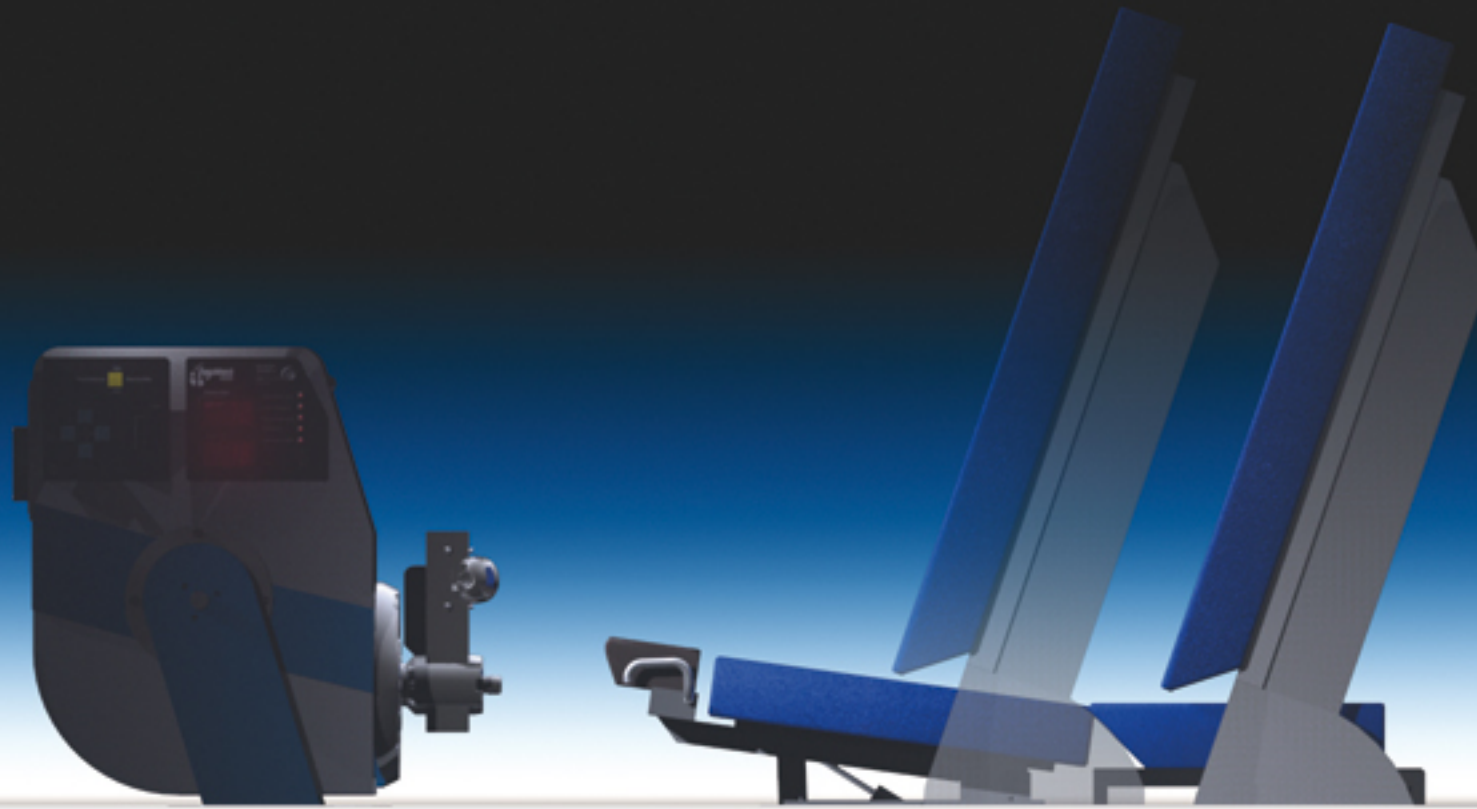




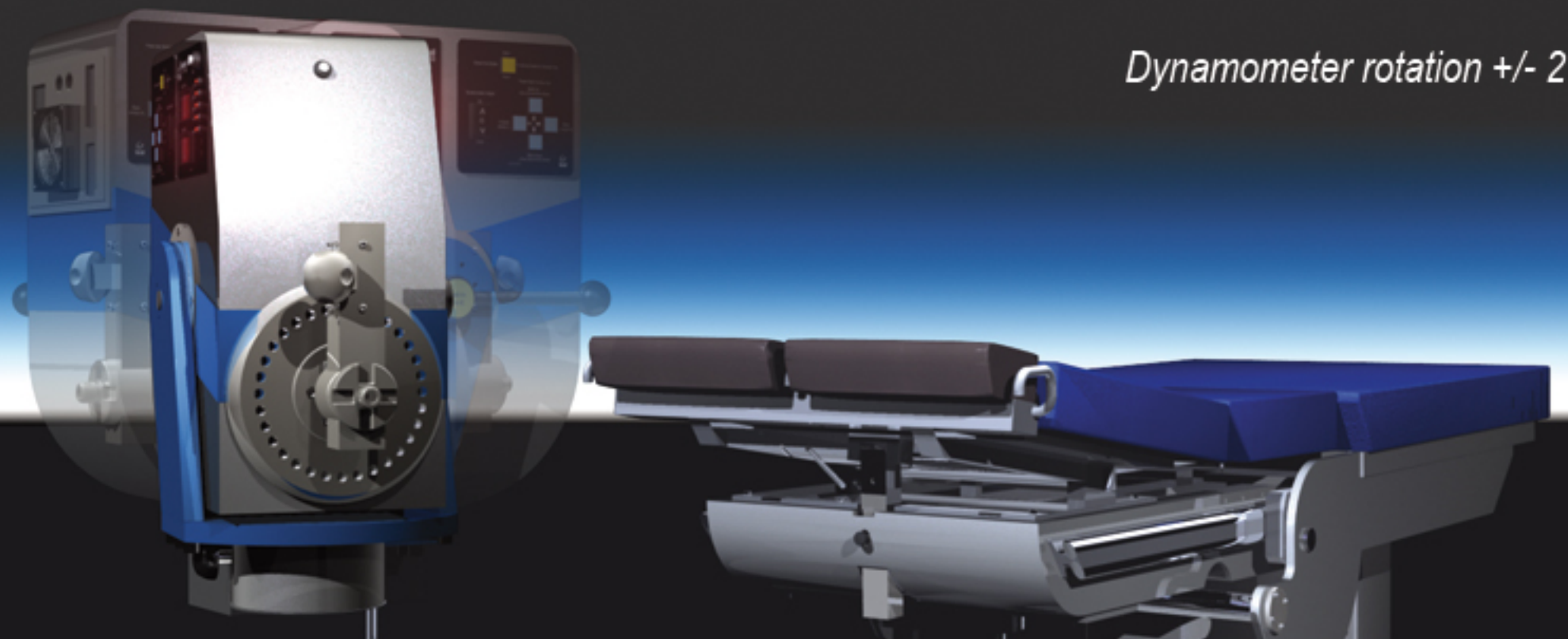
*Inclination of backrest 0 - 88°*



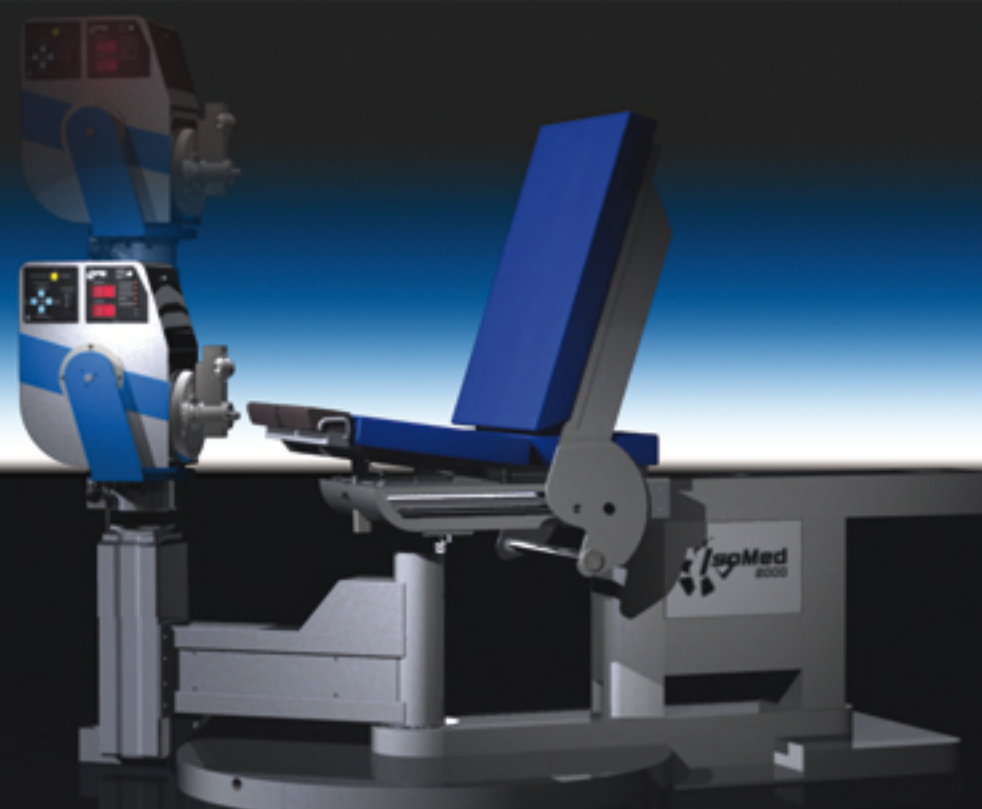
*Displacement of backrest 0 - 250mm*



*Dynamometer rotation +/- 270°*



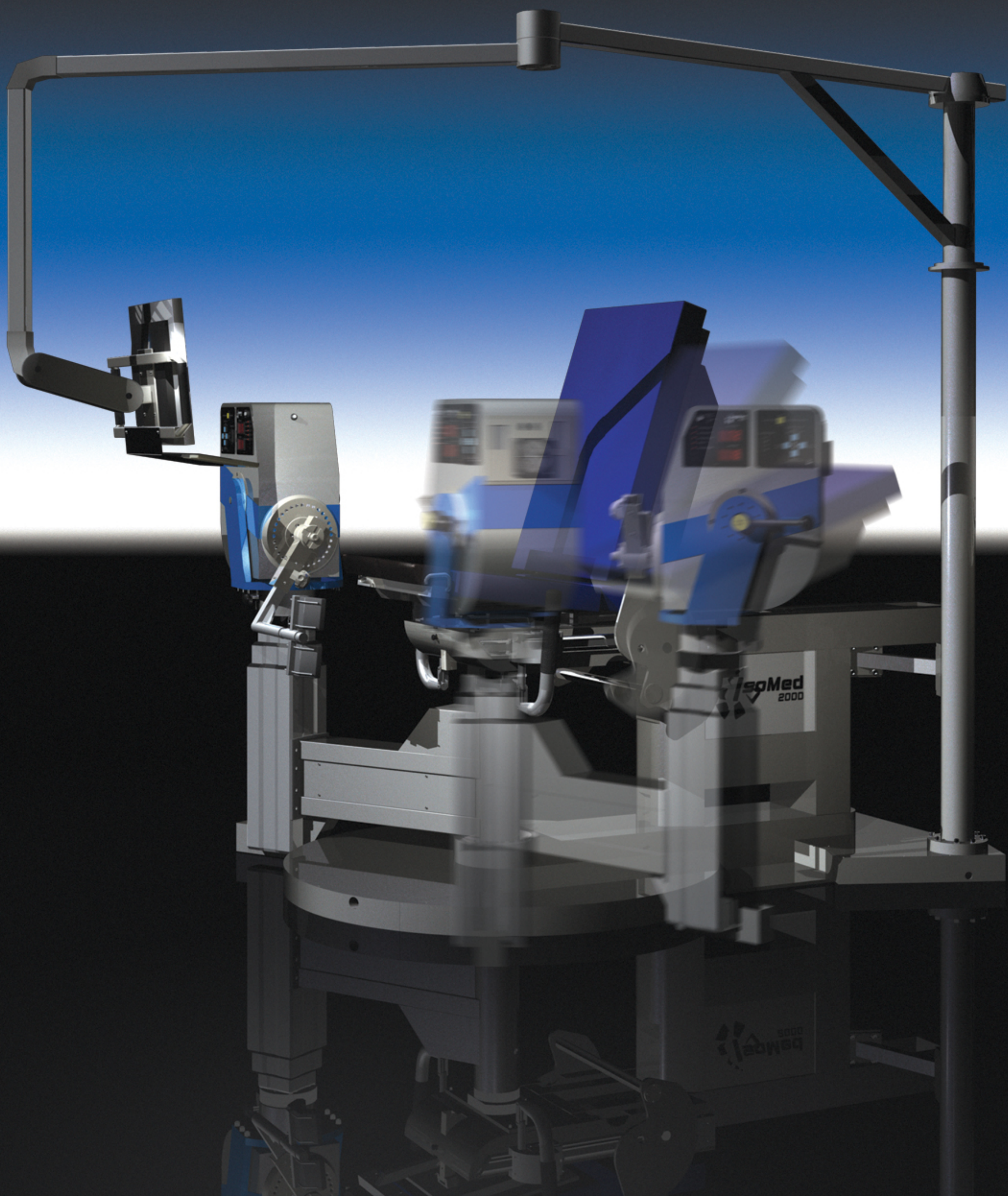
*Lifting height 0 - 600mm*



*Swivel range of satellite +/- 160°*









There are many little helpers in the IsoMed 2000 system. Some of them just cannot be stopped. Not even by walls or great heights. Or do you happen to know an assistant who will cover distances as great as our Wireless LAN system does?

### Speed

There are plenty of Wireless Local Area Networks systems today. The IsoMed series takes advantage of this by carefully employing the most adequate functionalities. An interactive data transfer during a training session, for example, will transmit all relevant training results as planned to a MS Windows computer. All functions use state-of-the-art technology like the new 802.11g standard which ensures data transmission rates five times higher than before. Since safety is a primary issue, coding can be integrated on demand. This means, teams can easily and securely be formed

to allow spatially independent groups consisting of test person, therapist and physician or of athlete and trainer to optimize their results.

### Multitasking

The IsoMed 2000 WLAN is designed to externally analyse all data immediately after a training session so that results are ready to be discussed with the test person. While this is going on, IsoMed 2000 is already available for the next session. Idle time is kept to the absolute minimum this way. Meanwhile, you can use a clearly laid out Windows program to explain

to your test person what should be observed and what could be improved. Using a version you can optionally order for your IsoMed equipment, you can also compare data sets, visualise results, print graphics and export and actively process data.



*IsoMed analyze for Windows XP*







## A choice of exercises\*

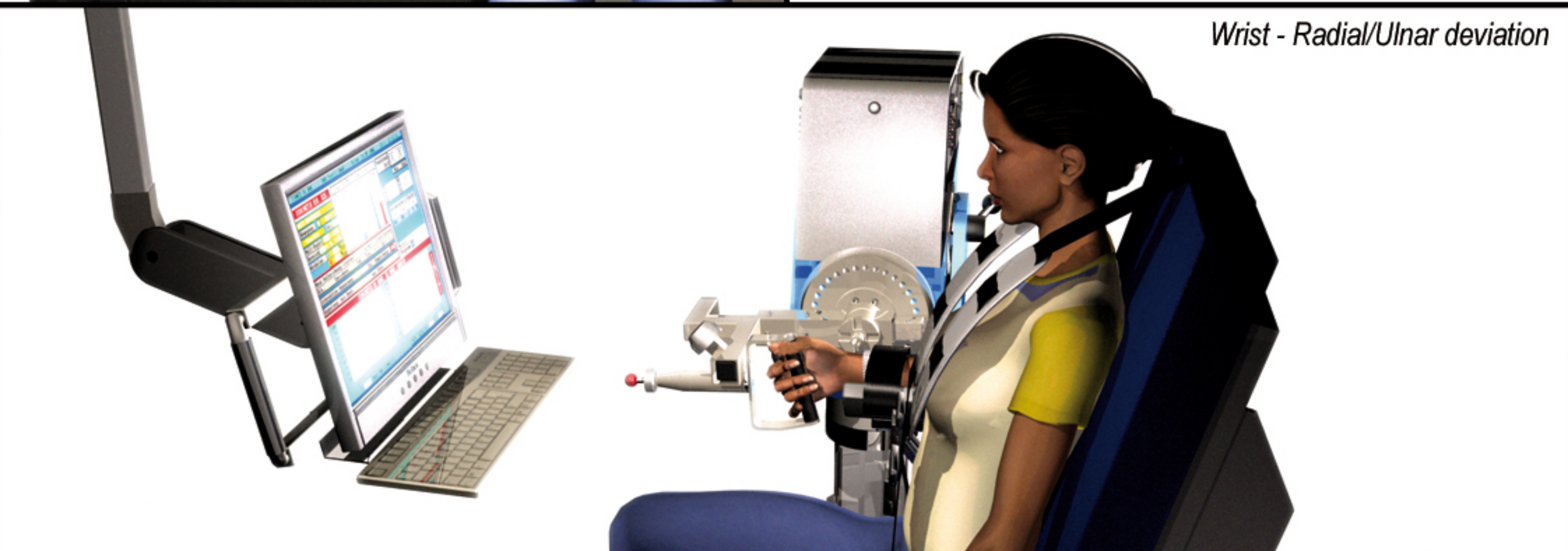


Elbow - Flexion/Extension

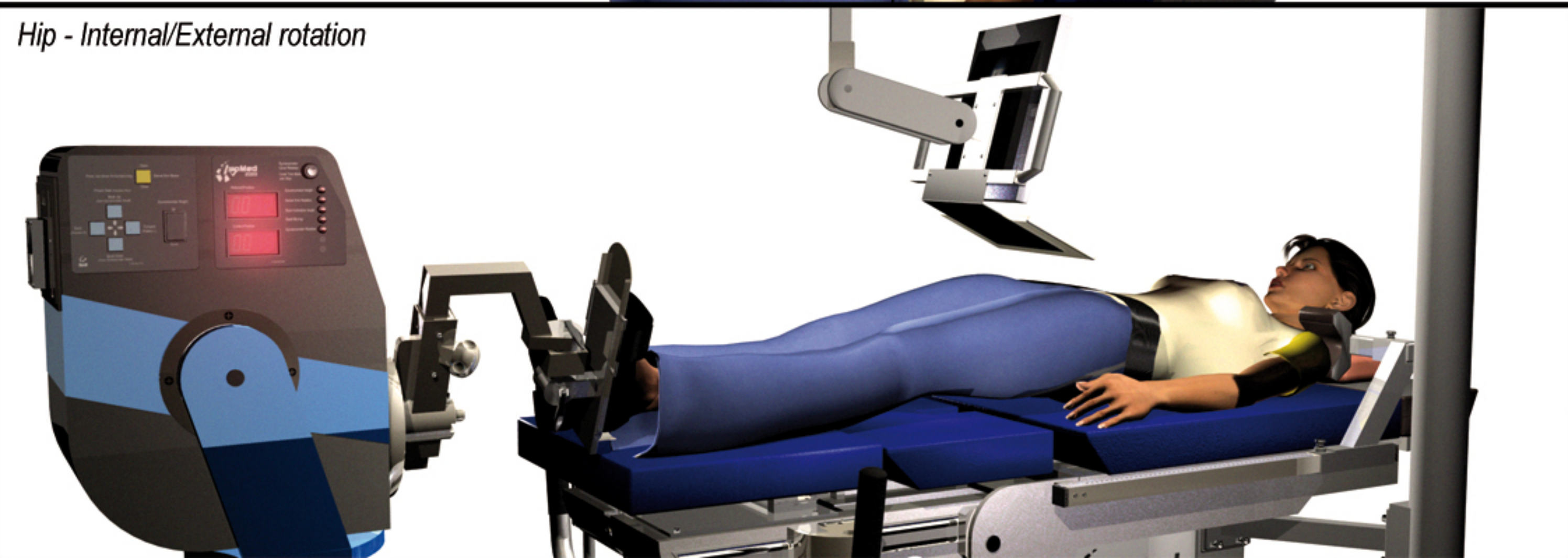


Knee - Flexion/Extension

Wrist - Radial/Ulnar deviation



Hip - Internal/External rotation

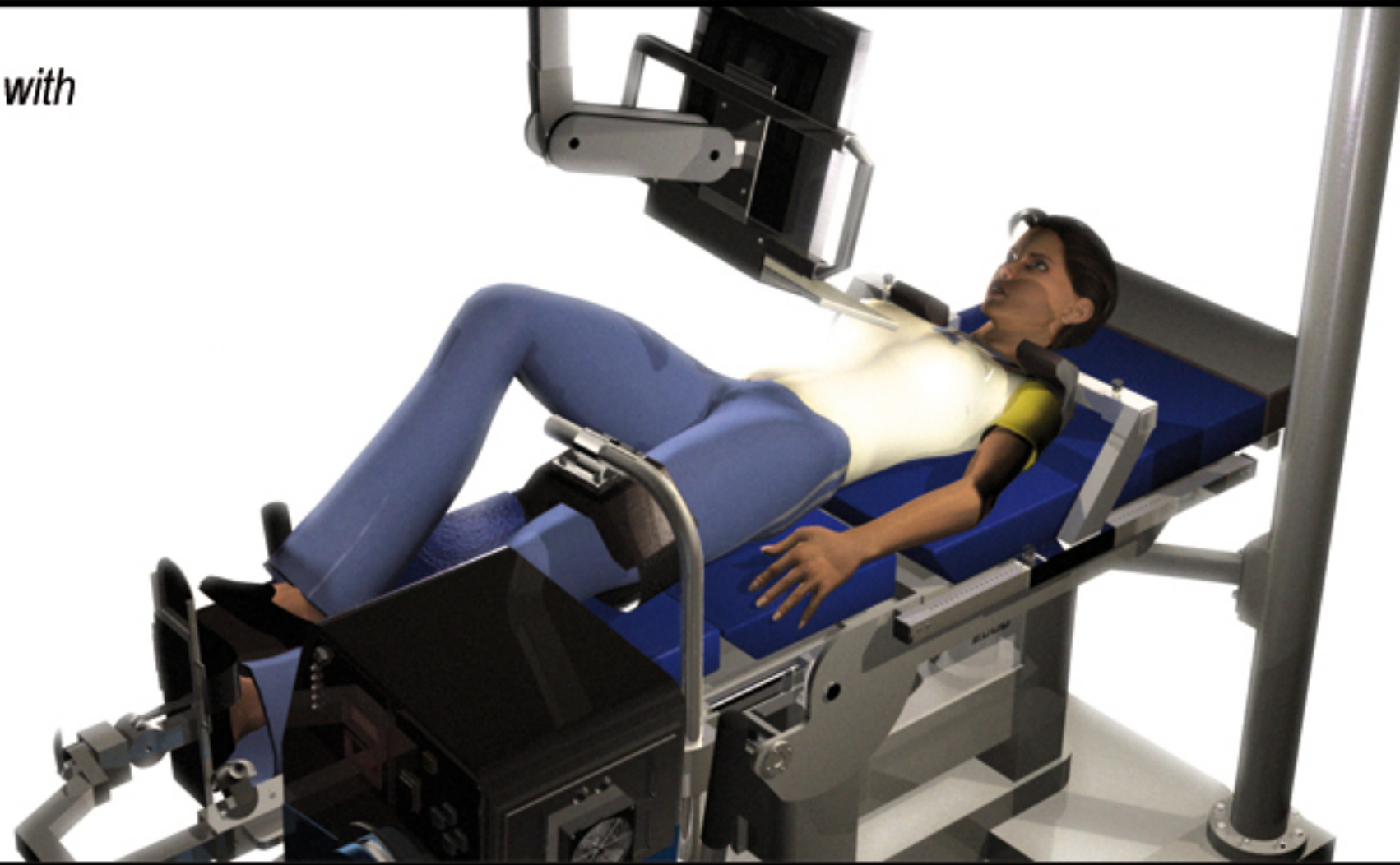




*Ankle - Inversion/Eversion*

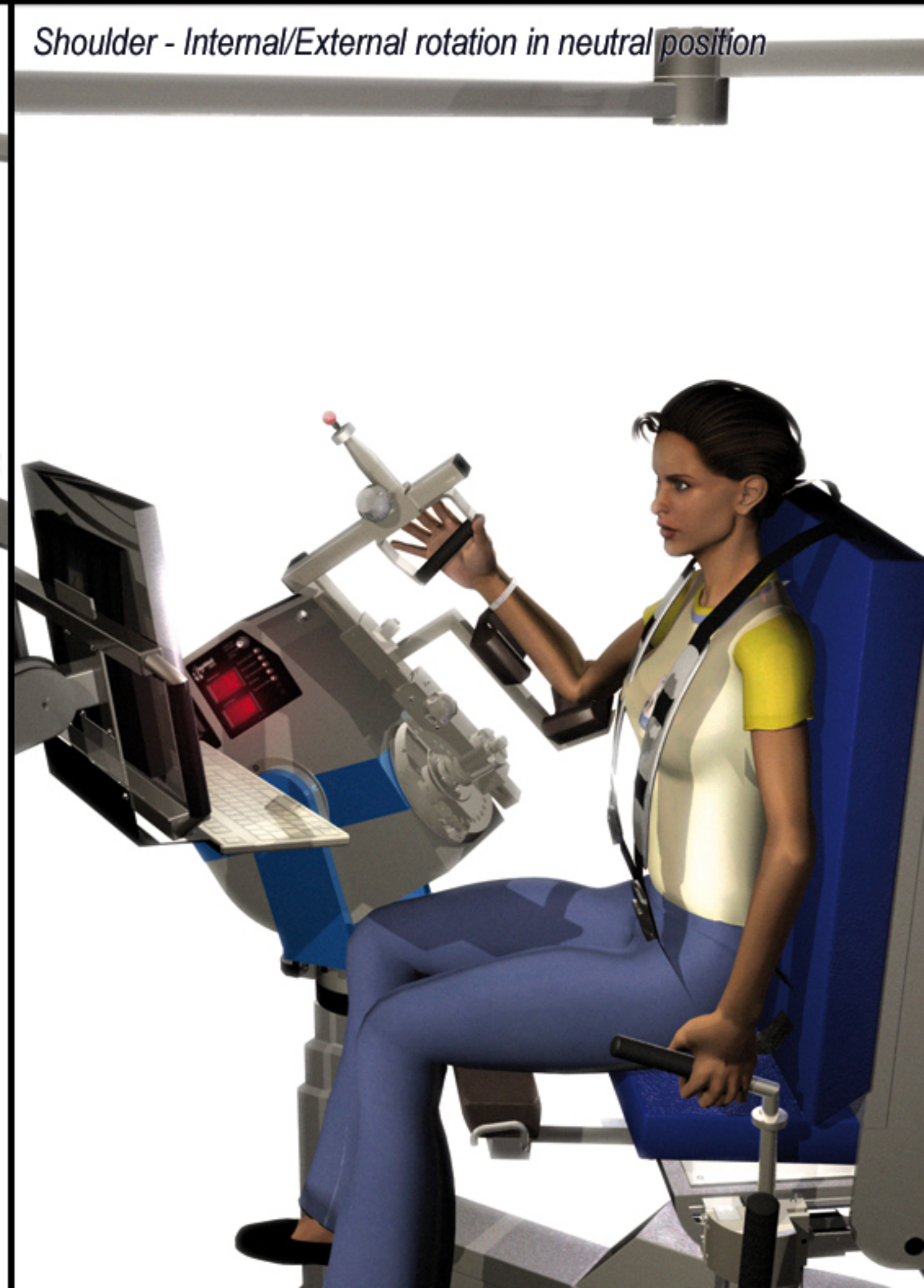


*Ankle - Plantar/Dorsiflexion with knee extended*



*Shoulder - Abduction/Adduction vertical*

*Shoulder - Internal/External rotation in neutral position*





A choice of adapters\*



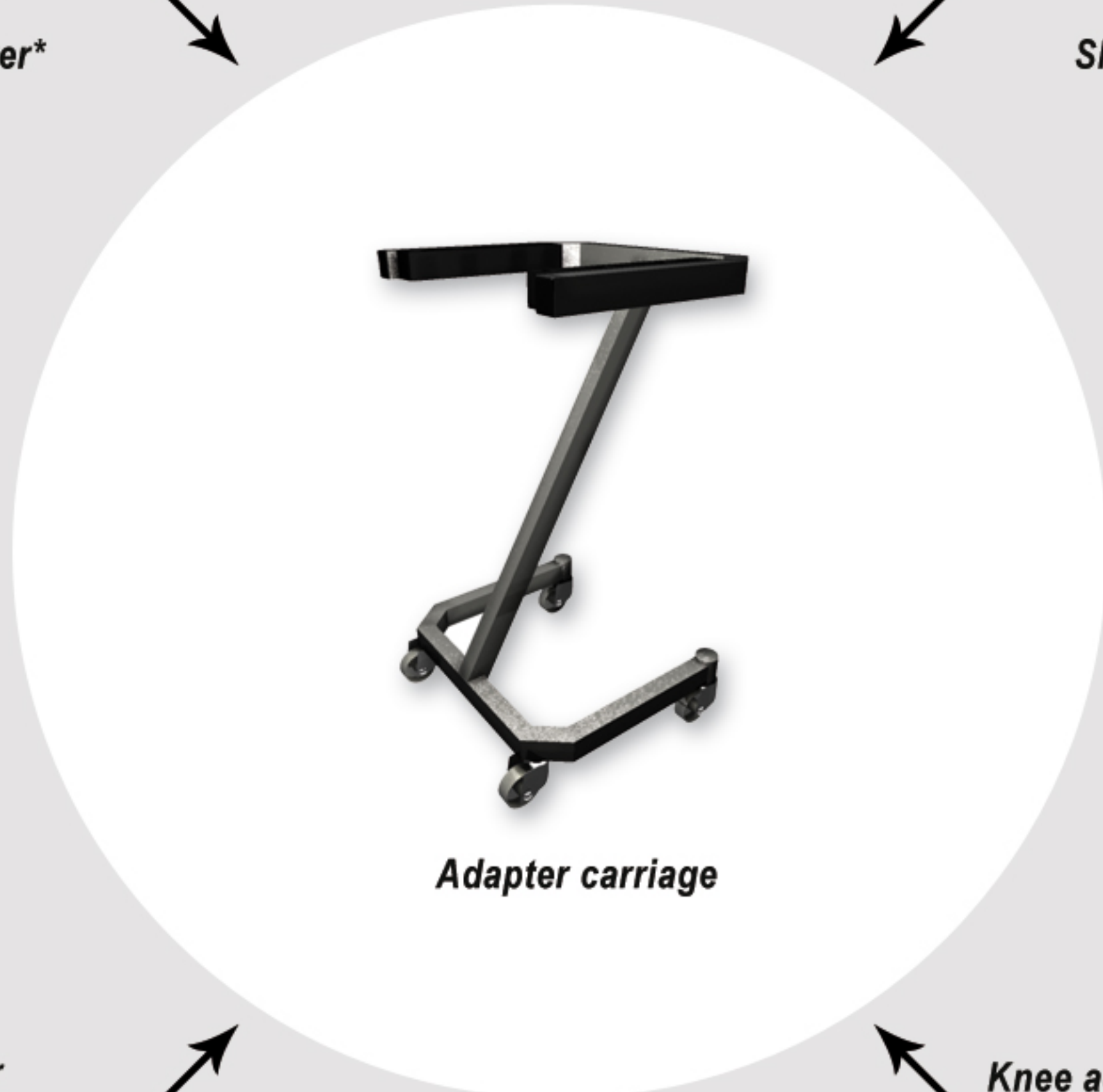
*Linear hand adapter*



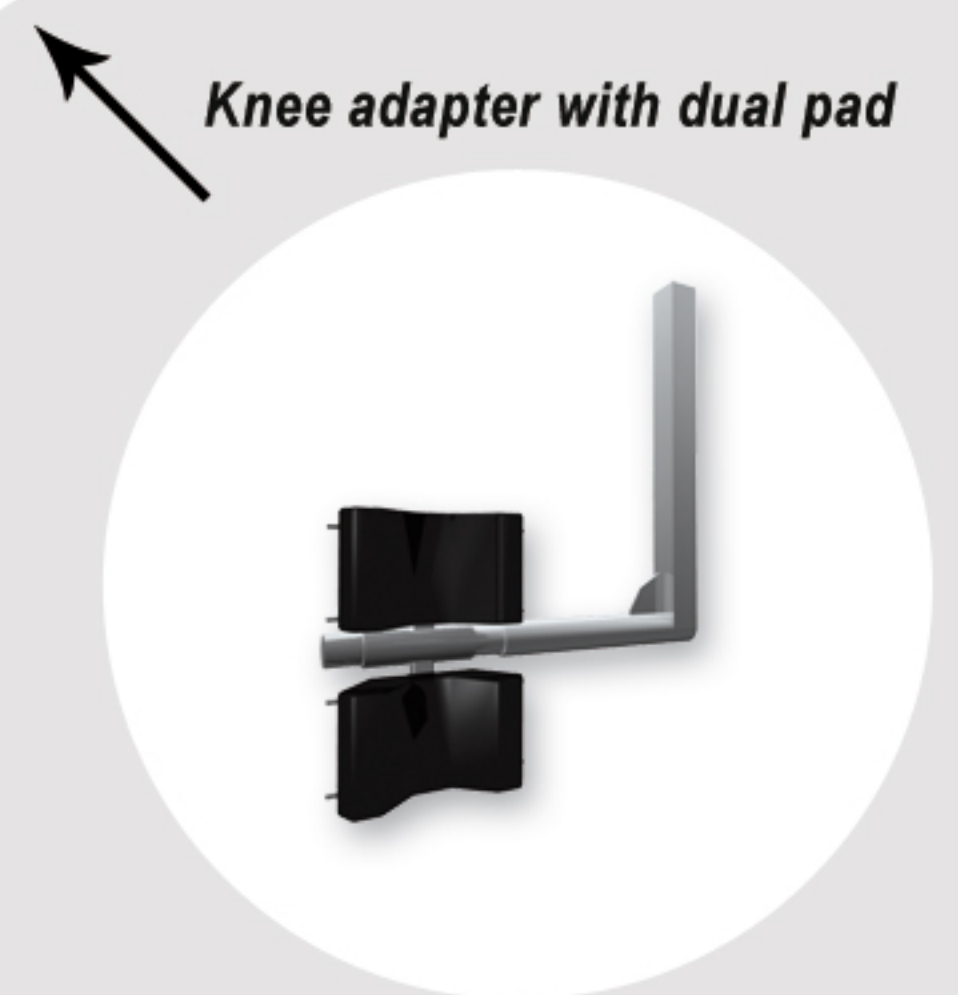
*Shoulder adapter*



*3D foot adapter\**



*Adapter carriage*



*Knee adapter with dual pad*



*Z adapter*

Technical data

# Characteristics

## Choice

Dynamometer satellite system with swivel ranges of +/- 160°

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Dynamometer with panel control on both sides and LED visualising (*DIRECT CONTROL*)

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Bayonet locking system without screws for additional adapters (Back Module, X-Series) integrated in dynamometer hub (*DIRECT CONNECT*)

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Positively locking, torsionally stiff dynamometer rotation in steps of 0.5 degrees with electronic *OneClick* fixation and unlocking of dynamometer head

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Integrated overarm monitor support arm system for current 17" TFT-monitors with 3m swivel range - infinitely height adjustable and swivelling (*DIRECT VIEW*)

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Compatible adapter carriage with a wide choice of knee, shoulder, leg and foot adapters for the IsoMed 2000 system

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Maintenance-free electronic linear and rotation drives for lifting column, back rest inclination and back rest shift

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Sensory position detection including integration into IsoMed software for lifting column height, back rest inclination and displacement, swivel arm rotation, dynamometer rotation and dynamometer inclination

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Triple telescopic lifting column with twin drive system (600mm total travel)

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Precision AddAdapter *SLED SYSTEM* with multi ball bearing, designed to be operated with one hand

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*AddAdapter* delivered as standard are, forearm-elbow support, upper arm support, thigh support and handholds

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Sophisticated single pads for the seating system with balanced full padding and a carefully balanced degree of hardness

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Peripheral stationary control electronics away from operating range integrated in a separate electronic control box

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# Optional equipment

## Choice

Fully automated position recognition of the 6 main axes of the system. Simultaneous archiving of individual test person settings (*MEMOTRONIC*). Repositioning of already stored position settings within target segments included. This guarantees a maximum of security for the test person and user

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Wireless LAN System, including software and data evaluation based on Windows (IsoMed *analyze*). Compatible with Centrino and WiFi certified

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Extended analysing software (*analyze plus*) for Windows 2000, XP or 2003 Server-Systems, including direct data comparison, extended pruning and exporting options, default curve calculation and database

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IsoMed software package, including individually storable motivation curves that can be scaled in 5% steps. Additional maximum and minimum torque regulation according to curve progression and activatable default curve adaption according to the fatigue progression of the test person.

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Shoulder support system that can be used lying down as well as sitting down. The ergonomic V-shape and the basic positioning of the support create together with individual adjustment options for a fixation instrument which eliminates all the disadvantages of belt systems. Axial displacement of the torso in ankle exercises or hip leverage in classical knee flexing/extension exercises are reduced to a minimum

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Dual Shin Pad with double rest supports for better wearing comfort and asymmetrical axial distribution. Reduces joint strain in knee flexion/extension exercises

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2 analogous exits for power/torque and path/angle (DC-isolated or based on mass). For synchronising external components (e.g. EMS)

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## Choice of additional external modules

Back Modules in versions 500Nm and 1000Nm (motoric and mechanic limiting load over 2000Nm\*) with 5 electromotoric adapting components. MEMOTRONIC-compatible.

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Lineary modul „*athletic*“ - electronic twin lifting column adjustment (400mm) included. Loadable up to 8500N, maximum speed 1,2m/s and acceleration/deceleration up to 10m/s<sup>2</sup>. Direct measuring is carried out with integrated power measuring plate.



# Technical data

|  | Standard             | Optional              |
|--|----------------------|-----------------------|
| Torque, maximum, concentric/excentric                | 500Nm                | 700   750Nm           |
| Torque, maximum at Emergency-Stop                    | 1680Nm               | 1950Nm                |
| Integrated electro-mechanic holding break            | 380Nm                | -                     |
| Speed, minimum/maximum                               | 2°/s   450°/s        | 1°/s   560°/s         |
| Operating range, any segment of a circle up to       | 340°                 | -                     |
| Acceleration and deceleration, maximum               | 8500°/s <sup>2</sup> | 11000°/s <sup>2</sup> |
| Max. motor capacity, 2,5s/10 minutes/unlimited       | 15/8/2.8 KW          | 20.5/11/2.8 KW        |
| Torque measuring precision                           | 0.25% FS             | -                     |
| Torque resolution                                    | 0.0244% FS/12bit     | 0.0015% FS/16bit      |
| Torque filter cutoff frequency                       | 200Hz                | 1000Hz                |
| Angle precision directly on driveshaft               | 0.035% FS < 0.125°   | -                     |
| Reverse backlash in cycloid gearbox without backlash | 0°                   | -                     |
| Stiffness at +/-175Nm, +/-350Nm, +/-500Nm            | 28/39/45(Nm/arc min) | -                     |

## Installation conditions

### Power connection

|                       |  |
|-----------------------|--|
| Nominal voltage       | 3*380 - 410 VAC + N + PE +/- 10% with min. 2,5mm <sup>2</sup> wire cross sections* |
| Nominal frequency     | 50/60 Hz   |
| Nominal current       | 3*16 A   |
| Nominal power         | Max 8 - 15 KW - depending on modell  |
| Nom. fuse protection  | Automatic circuit breaker 3*16 A - time delay                                      |
| Nom. power connection | If not medically used via CEE 16 A wall socket. Otherwise fixed connection.        |
| Nom. protection class | Protection class 1   |

### Wet areas

2 m minimum distance of wet areas (wash basin, shower, etc.) to electric control box

### Environmental conditions

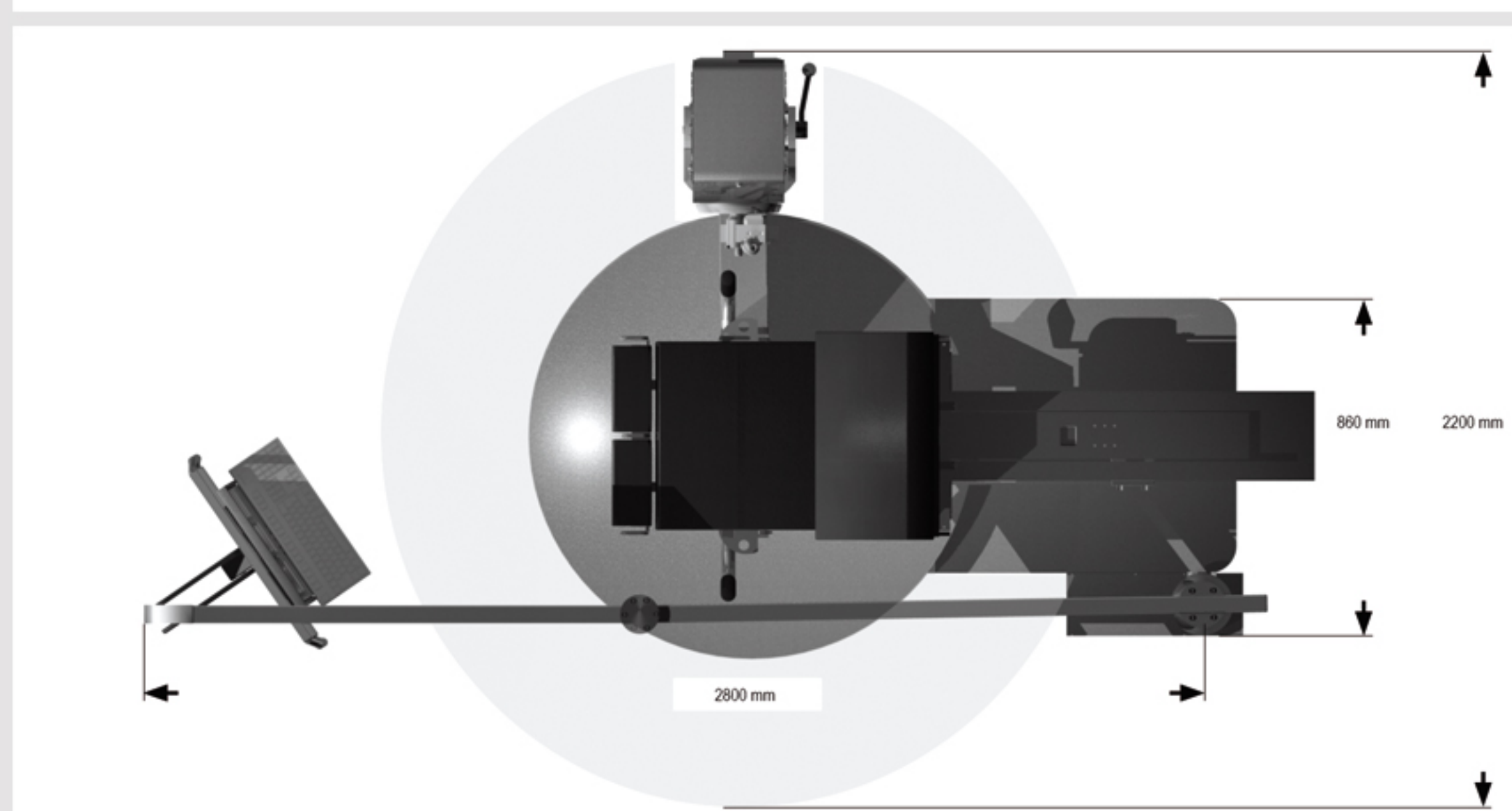
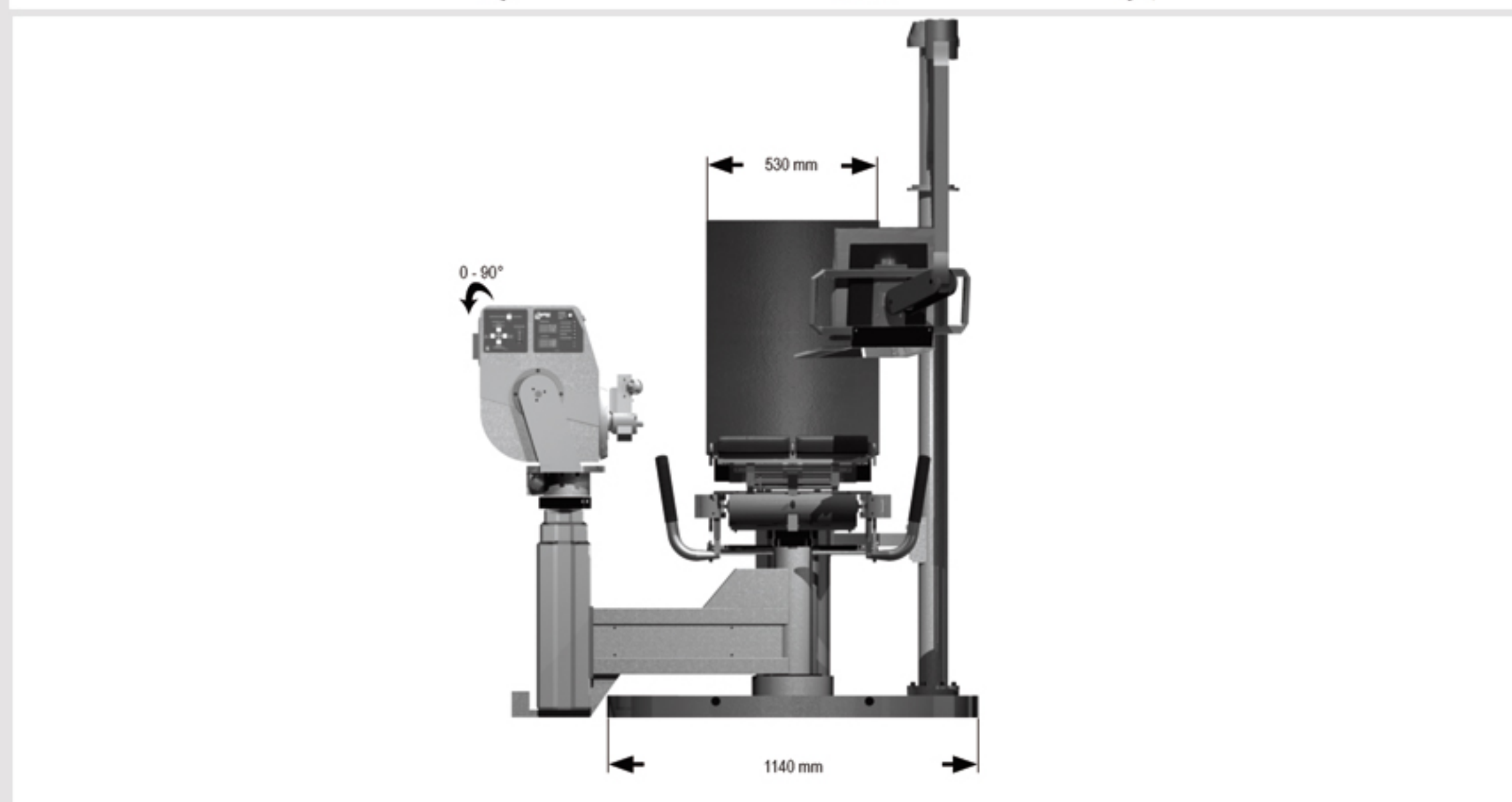
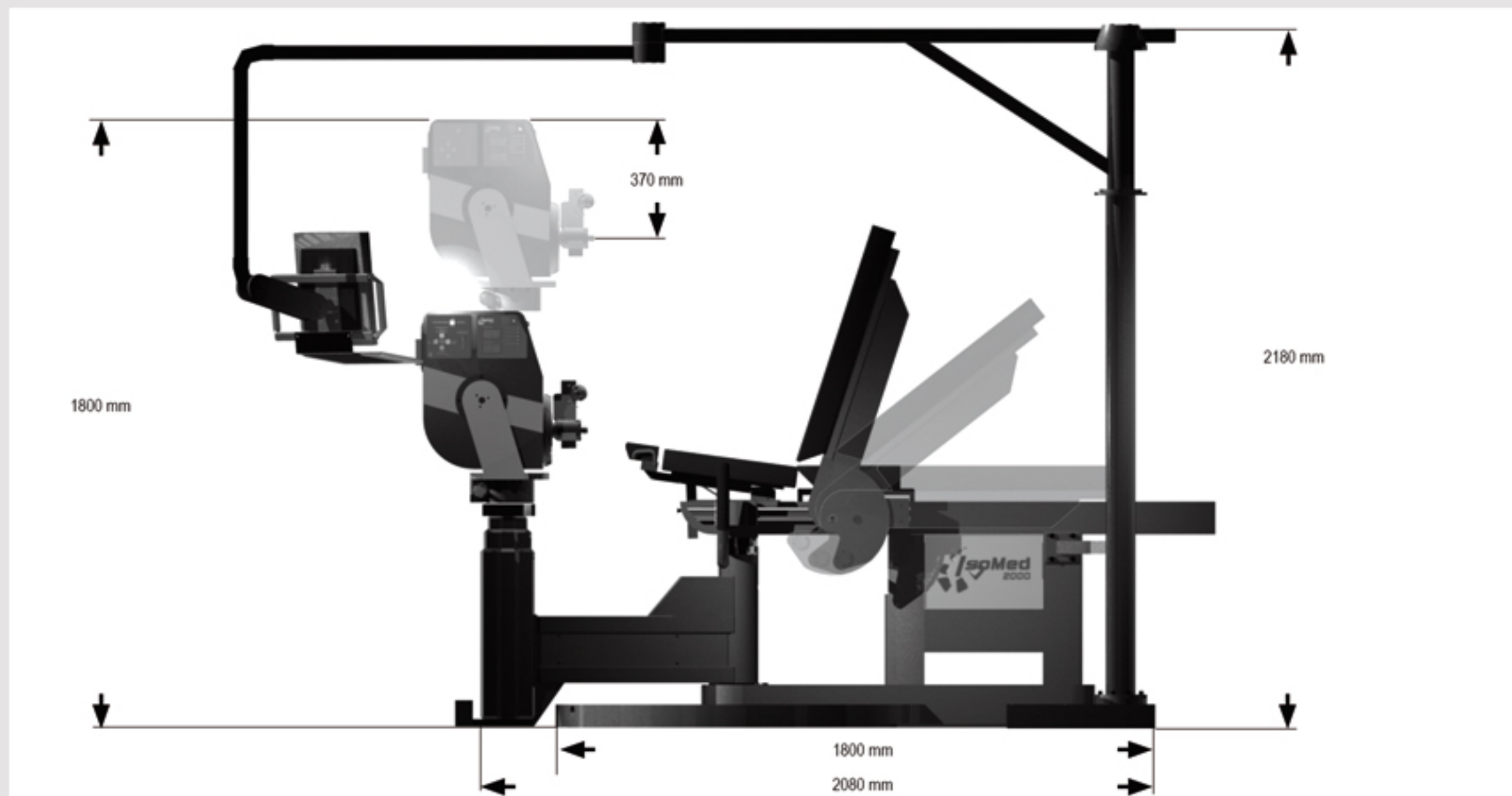
|             |   |
|-------------|---|
| Temperature | Suitable for storage: 10° - 45° C. No condensation. Operable: 15° - 30° C |
| Humidity    | 20% to 80% relative humidity, no condensation                             |
| Air purity  | Elevated dust concentration can reduce life time of ventilators           |

### Installation location statics

Overall weight is 680kg distributed over 2,6 m<sup>2</sup>. 150 kg/dm<sup>2</sup> maximum punctual load. Flat and stable floor surface required.\*\*



# Dimensions





If you own an IsoMed, you can experience for yourself its high level of technical finesse and its exquisite look and touch. It is usually only through the keyhole, though, that you can see how your IsoMed was developed with the help of state-of-the-art software systems combined with high precision engineering.

## Technology

For the development of equipment which is to meet high expectations regarding innovation and technology, you need the adequate means to turn the idea into action. D&R therefore predominantly uses highly developed software systems which support the design process from the developed of a vision onwards with visualisations, simulations or feasibility studies. During the computer-assisted design of our machines we use endurance testing to make sure the machines you will own meet all of the high standards we promise to maintain.

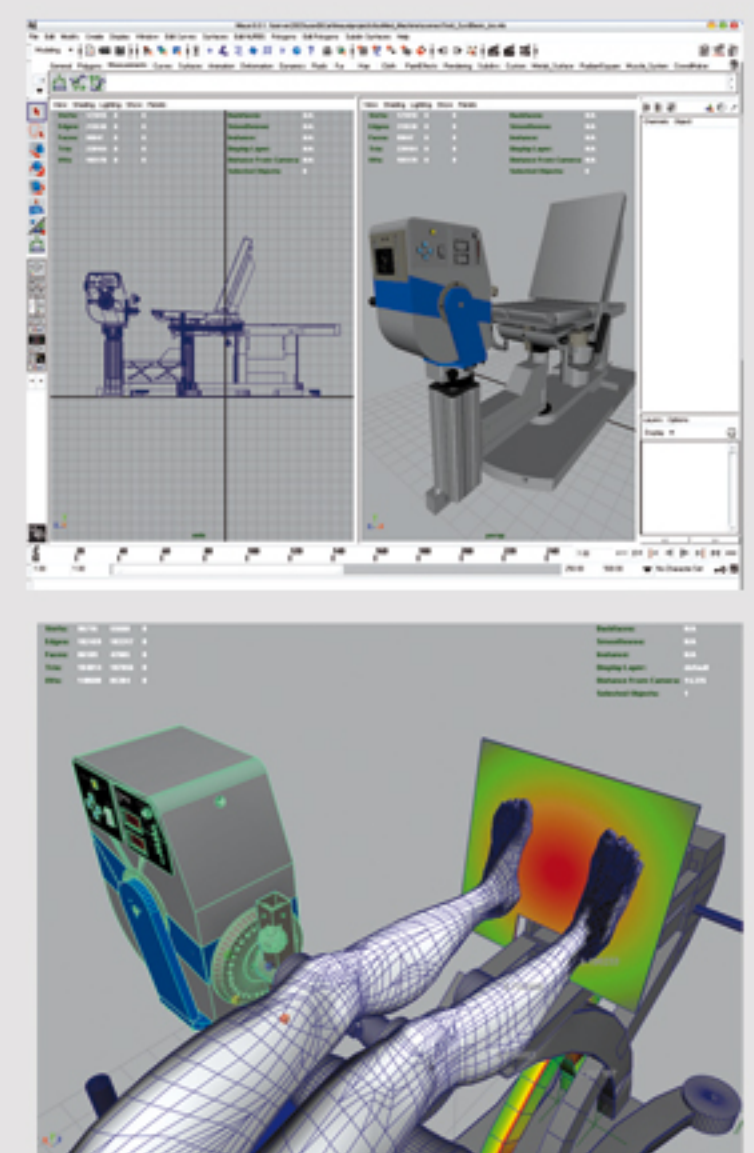
## Simulation

We only build newly developed or enhanced equipment after severe testing. The first test persons we let try out our developments are invariably divers virtual dummies.

Originally developed for use in the car industry, these colleagues can adopt all sizes so that we are able to act out every conceivable situation with their help.

Even anatomically correct muscle simulations are possible without causing any pain. Real life injury risks can be greatly reduced this way while the versatility of our machines drastically increases. Once delivered, you will have the final result

of a laborious and sophisticated development on your premises. You certainly will enjoy your equipment for a long time - excellent engineering and greatest precision of our products will guarantee for this.







***D&R Testfile Nr. SIM\_0102305\_RevB12***

*Or rather: „Jessi“, as our developers will only call her. With her help we are able to safely simulate potentially dangerous test runs even before we build a prototype. This way we create perfectly adapted systems that her real-life fellows can use without worry.*



These are our ideas. And the machines of the IsoMed 2000 series.

Time, you did something about them.

Learn to know the real thing!









All information correct at time of going to press (12 July 2005)

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