

EXENTRIX

MULTIFUNCTION TRAINING SYSTEM



MUSCLES AND BRAIN

Exentrix is, simply said, a revolution in functional strength training.

It has powerful muscles - an electrical motor to provide resistance, and a technological brain for the ultimate training experience.

By choosing among its five different training modes, Exentrix can simulate and beat out any existing exercise equipment such as free weights, flywheel devices for eccentric training, isokinetic machines, rubber bands, aerobic rowers and more.

The resistance, speed, inertia and range of motion can be adjusted independently for the concentric and eccentric phases. Unique additional features unleash the benefit of combined strength and vibration training, plus random-generated perturbations to train the athlete's reactivity.

Performance can be monitored thanks to its real-time feedback, but this is just the beginning! Exentrix has been designed having flexibility in mind, as it also offers up to four additional, fully customizable training modes. Furthermore, it has expansion inputs and outputs to interface with any desired sensor or external device.

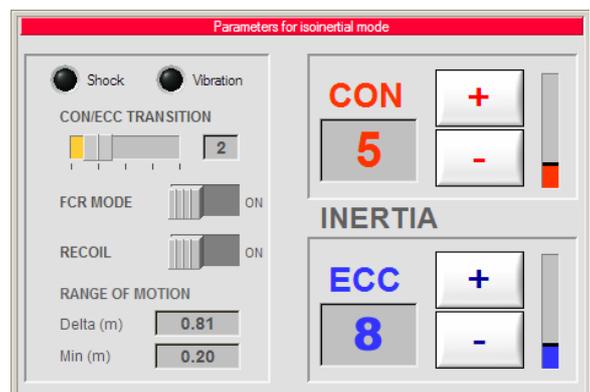
Exentrix has been used by living legend and kayak Olympic champion Josefa Idem - the only women who attended eight Olympic games! - during her preparation for London 2012, by Giuliano Razzoli (Olympic gold medal in slalom at Vancouver 2010), and by the National Italian Football team during the FIFA World Cup 2014 in Brazil.

FIVE MACHINES IN ONE

By continuously measuring and controlling speed, force, power and acceleration, Exentrix offers five different training modes; it's like having five different training devices, each one more sophisticated than its conventional counterpart:

► **ISOINERTIAL (FLYWHEEL TRAINING)** by reproducing the resistance popular flywheel devices, Exentrix can be used for flywheel eccentric training, whose effectiveness has been demonstrated by over 20 years of scientific evidence.

But with so much more! As an active device, Exentrix can reproduce a different inertia for the CON and ECC phase (for example, a lighter flywheel during CON, and a heavier one during ECC), which is impossible to obtain with classical flywheel machines. This allows achieving desired eccentric overload without exhausting the athlete in the CON phase.



Also the transition between CON and ECC can be adjusted from abrupt (like in flywheel devices) to smoother (like in conical inertial devices).

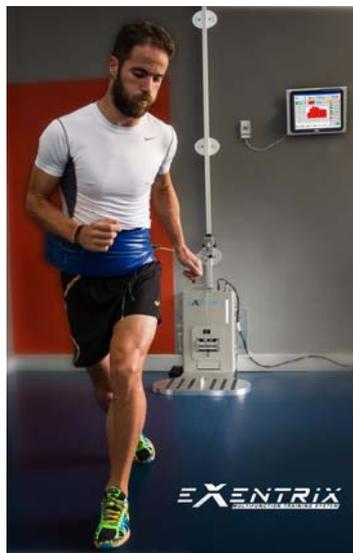
Changing inertia and range of motion is done by just a click of a button, even during the exercise. And thanks to its unique *Force-Controlled Recoil (FCR)* option, the machine automatically adjusts the range of motion, even from repetition to repetition - a major limitation in conventional flywheel devices!

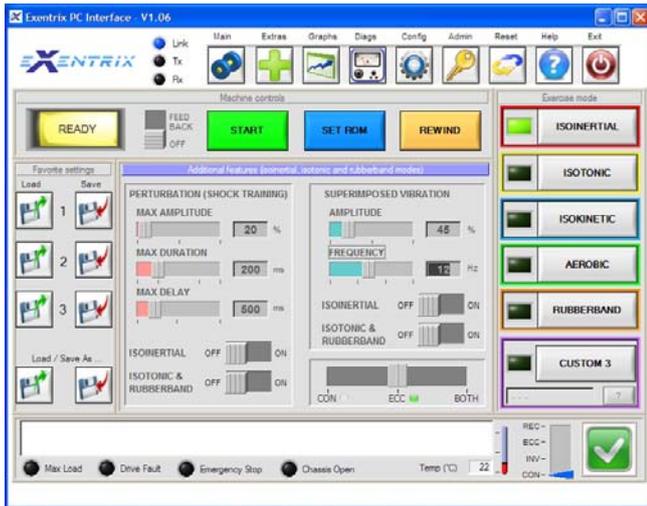
- ▶ **ISOTONIC (FREE WEIGHTS)** generates constant force regardless of execution speed. The load in kg can be adjusted separately for the concentric (CON) and eccentric (ECC) phases
- ▶ **ISOKINETIC (CONSTANT SPEED)** as in much more expensive isokinetic machines, speed is constant regardless of force. This is perfect for rehabilitation, where speed needs to be limited to a maximum desired value. But is also an invaluable testing tool for estimating the subject's CON and ECC force-velocity curve, with any functional movement in a 3D-space, and same range of motion and biomechanics of actual exercises
- ▶ **AEROBIC** this training mode simulates popular rowers for cardiovascular conditioning, where resistance is a function of speed. So yes, Exentrix is not just for strength training!
- ▶ **RUBBER BAND** Exentrix can also recreate the resistance of rubber bands and bungee cords, where force is proportional to displacement, is safer than conventional weights and better adjusts to the angle-dependent efficiency of joint articulation. The option of different stiffness for the CON and ECC phase offers a peculiar "slingshot effect" for eccentric training

POWERFUL, VERSATILE, LIGHTWEIGHT

Exentrix is composed by the following components:

- ▶ the motor unit: the brain and muscle of the machine, it's small and compact, easily transportable. The resistance is transferred by a ultra-resistant rope in any desired direction which allows the execution of unlimited exercises
- ▶ optional accessories, such as a wall-mount column to allow pulling the rope from different heights and directions; a foot platform for squat exercise, a MultiExer structure for leg press, seated row etc; harness and so on. We are constantly expanding our portfolio, so check back often!





GOOD VIBRATIONS

Vibrations are good. This is why Exentrix offers the benefit of joint strength and vibration training at once.

Just enable the vibration option, adjust the frequency and amplitude and select the phase where you want vibrations to be active: CON, ECC or both.

Superimposed vibrations are available in isotonic (free weight), isoinertial (flywheel) and rubber band modes.

EXPECTING THE UNEXPECTED

Another unique feature allows generating unexpected twitches with random duration and force, in casual instants of time. This is an extremely handy method to train the subject's reactivity to unexpected perturbations which can occur to athletes during actual competitions, or to normal subjects in real-life (for example in rehabilitation of elderly patients).

SAFETY FIRST

Exentrix is safe. It uses no actual weights or flywheels, but just the smart force generated by its motor. Since it has no moving masses, in an emergency situation it can stop immediately without harming the subject.

The range of motion is adjustable within a desired safety range. If minimum displacement or joint angle is reached, the motor stops immediately and waits for the subject to resume the exercise. This is an invaluable provision during rehabilitation, to limit the joint angle excursion within safe, adjustable limits. Exentrix also has a safety switch that stops the motor immediately.

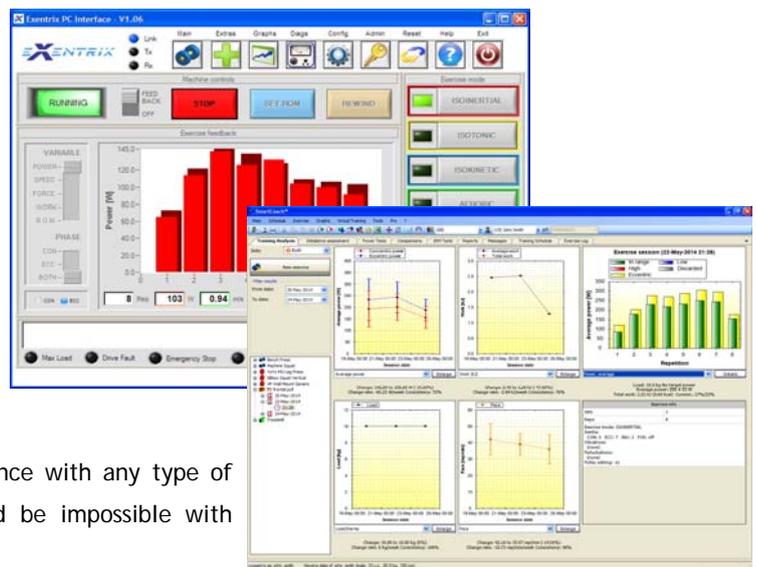
PERFORMANCE UNDER CONTROL

A popular saying states that power is nothing without control. That is our philosophy, too. For this reason, we equipped Exentrix with a real-time feedback that displays the desired training variable on an intuitive bar graph.

For each repetition, the feedback displays CON, ECC or both values of the selected variable among power, speed, force, work and range of motion.

This invaluable feature allows controlling the performance with any type of linear and non-linear movement, even where it would be impossible with conventional devices (such as rubber bands).

But that's not it! Exentrix software connects to the SmartCoach software, so all the training data is automatically stored for subsequent analysis and reporting. This makes SmartCoach the perfect integrated environment to monitor the training with now matter which device, whether it's a simple barbell, weight machine, flywheel device or Exentrix.



FORCE OR SPEED? BOTH!

In functional drills you need power and speed. That is why Exentrix rather uses the overwhelming power of its motor (1.3 kW!) to allow high execution speeds for explosive movements. Yet, if you need more force, Exentrix can use a pulley to double its force at half the maximum speed, working on the left portion of the subject's force-velocity curve. No compromises.

MORE THAN A TRAINING DEVICE

For more scientific applications you can also display, control and export to Excel the raw graphs of all the training variables: speed, force, power, displacement, phase (CON or ECC), and even data from external sensors!

This feature can also be used to check in greater detail the exact execution, such as force and speed as a function of the joint angle and repetition phase.

Raw data can be exported to Excel and also synchronized with external acquisition devices through Exentrix's expansion interface.



CONNECTIVITY IS THE KEY

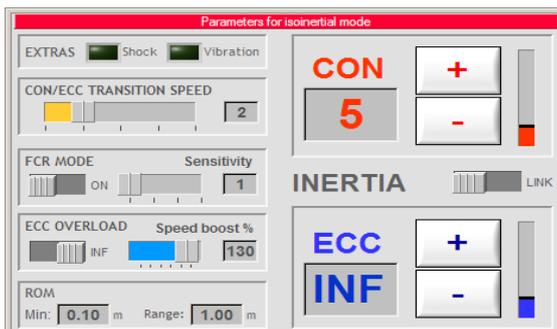
Sometimes you might want to monitor more than what Exentrix can control itself. Therefore, it is equipped with a versatile, multi-channel expansion interface to connect any external sensor or device including: joint goniometers, load cells, contact platforms, photocells, accelerometers, surface EMG probes, and more.

It is also possible to expand Exentrix by connecting visual indicators, buzzers, use its outputs to synchronize with external devices (acquisition systems, neuromuscular stimulators) or drive equipment such as ancillary motors or servomechanisms.

All the inputs/outputs feature class BF, medical-grade galvanic and optical isolation for maximum safety. Our Technical Support is available to manufacture any adapter cable or interface you might need.

TAILORED TO YOUR NEEDS

Even if we equipped Exentrix with a comprehensive set of training modes, you might have better ideas than us. Or maybe, just different, sport-specific needs. So you can exploit the full potential of Exentrix with four additional, fully customizable training modes. Simply tell us how should the machine work, and we will develop your custom training mode for you.



We also have a portfolio of ready-to-use customizations. An example is the *IserKinetic* custom pack: a mixed training mode where Exentrix behaves like a flywheel device during CON, and isokinetic (constant speed) during ECC to allow truly unlimited eccentric overload. It also has a *Speed Boost* option to set the ECC speed as an adjustable percentage of CON, both in pure isoinertial mode and in mixed isoinertial/Isokinetic.

Customizations do not require expensive on-site servicing: it is done by delivering a “custom pack” file to upload to your device and upgrade it. That’s how easy it is!

GET REWARDED FOR YOUR IDEAS

Got a great idea for a custom training mode? For example, an innovative methodology to train a specific sport or gesture, or to recover from certain injuries? Your custom training mode will be added to our Custom Library Store, so each time another customer buys it, you will be rewarded with a royalty.



FULL CONTROL AT YOUR FINGERTIPS

You can control Exentrix with any computer equipped with its software. Or, to make it more practical, we offer the option of a 10” touchscreen SmartCoach™ Pad interface.

If you already own of a SmartCoach™ Pro system, you can use the Pad alternatively for SmartCoach or for Exentrix, and have full control at your fingertips!

And with the SmartCoach connectivity, Exentrix training data is automatically sent to any computer in the SmartCoach™ Pro environment; even remotely via cloud, thanks to SmartCoach’s unique remote coaching function.

ALWAYS UP TO DATE

Exentrix can be fully upgraded via software. This means, each time new software is released, your device will also be updated with its latest features, pretty much as you do with your smartphone. So your Exentrix will never get old!

UNLEASH YOUR CREATIVITY

You can transform a conventional training device (e.g. a leg extension) into a motor-powered, intelligent machine with all the potential of Exentrix! Just fasten the motor unit to its frame, and use it in place of the weight stack. And you have got a smart device that can work as a flywheel device, isokinetic machine, and revert to weight stack device in seconds - just selecting isotonic mode.

Got an idea for your very own training device? You build the structure and we provide the motor unit - or even just the bare motor - and the customized exercise mode. Our Technical Support is available for our creative customers, by providing a range of services which range from mechanical design to production of cable adapters, interfaces and ancillary peripherals.

TECHNICAL SPECIFICATIONS

▶ MECHANICS

Max power: 1300W
Max force: 800N (1600N with pulley)
Max speed: 3.8m/s (1.9m/s with pulley)
Max rope displacement: 4-5m
Coupling: direct drive on 25 mm steel shaft
Rope: 5mm Dyneema[®] rope; max allowable tension: >4000N
Optional wall-mount column and squat platform

▶ ELECTRONICS

Power supply: 220V @ 5A, fuse-protected
Two analog inputs (differential/single-ended), dynamic input range 0-5V^(*)
Two digital inputs, dynamic input range 0-5V (TTL level)^(*)
Two analog PWM outputs, dynamic output range 0-5V^(*)
Two digital outputs, dynamic output range 0-5V (TTL level)^(*)
One multi-function CAN interface, for connection of up to 256 chained peripherals^(*)
Input/output sampling frequency: 100 samples/s per channel
^(*) one analog input available on dedicated front panel connector; all other inputs/outputs available on expansion connector

▶ SAFETY

Emergency safety switch/pedal
Biomedical grade, class BF, galvanically and optically isolated input/outputs
Electronically-controlled range of motion
Fuse-protected (6.3A) power stage

▶ TRAINING MODES AND OPTIONS

Isotonic (constant force) mode
Isokinetic (constant speed) mode
Isoinertial (flywheel) mode
Aerobic mode
Rubber band mode
Up to four fully-customizable training modes
Feature for superimposed vibrations (5-20Hz) available in isotonic, isoinertial and rubber band mode
Feature for superimposed unexpected perturbations available in isotonic, isoinertial and rubber band mode

▶ SOFTWARE

Available for Windows XP, Windows 7 and Windows 8
10" touchscreen interface (SmartCoach Pad) available

For additional info: www.smartcoach.eu/exentrix



smartcoach.eu/smartcoach_europe



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