KEISER POWERED™
EDUCATION | COACHING | TRAINING

FOUNDATIONS

KEISER INDOOR GROUP CYCLING

keiser.com/education | 800.888.7009
2470 S Cherry Ave | Fresno CA 93706 USA | education@keiser.com

#KeiserPowerED

TABLE OF CONTENTS

THE KEISER STORY

More than 20 years ago, Keiser set out to create a bike that would exceed the demands of indoor group cycling.

KEISER®

CHANGING THE WORLD OF CARDIO

Today, Keiser M Series indoor bikes fit riders of all body shapes and sizes thanks to our groundbreaking V-shape frame. They achieve a quiet – but true – road-bike experience with the industry's only drive-train built specifically for magnetic resistance.

As a result of our simple engineering designs and constant innovations, the Keiser M3 and M3i aren't just any indoor group cycling bikes – they're the most proven indoor group cycling bikes on the planet, with more than a quarter million sold worldwide and countless reviews placing them at the top of the industry.

Such accomplishments continue Keiser's longtime tradition of exercise innovation, which began four decades ago when we introduced pneumatic-resistance technology to the strength training industry. By providing an alternative to outdated iron resistance, we created a safer and faster way for people of all ages and ability levels to build strength at speed for true power. Following the engineering success with strength machines, we turned our sights to become the first company to use magnetic resistance. This technology enabled Keiser to revolutionize indoor group cycling by delivering a quiet, reliable, consistent ride with bikes that were the first to display power in real time. Today, Keiser's world-renowned Master Trainers offer the ongoing education, certification and tools to help instructors take indoor group cycling classes to the next level.

BECAUSE...
'GOOD ENOUGH' ISN'T.™

FOUNDATIONS

Keiser has worked with education and cycling experts worldwide to develop a comprehensive training program for indoor cycling. Using the Keiser M3/M3i Indoor Bikes, riders experience an indoor ride like no other, enlivened with an authentic cycling experience developed with bike-specific training and drills. Keiser Foundations is the first step on your Keiser indoor cycling journey.

The Foundations course was developed to provide both new and returning indoor cycling instructors with the tools and information necessary to teach effective, inspiring and safe classes. Foundations is a lecture- and practical-based course that covers specific information for planning, developing and instructing group indoor cycling classes.

TOPICS COVERED INCLUDE:

1. Reviewing the key features of the Keiser M Series Indoor Bike
2. Understanding, practicing and experiencing the benefits of correct bike set-up
3. Implementing metrics by effectively using the components of the on-board computer
4. Reviewing basic ride and exercise physiology
5. Understanding power and using Watts for measurable outcomes
6. Learning and experiencing correct cycling postures, cadence and pedaling technique
7. Understanding the key components of class formats and design
8. Reviewing the application of music, instructing techniques and skills

THE BENEFITS OF KEISER INDOOR CYCLING

- User-friendly program that simulates effective cycling workouts
- Correct posture(s) and drills to help cyclists improve their cycling technique
- Safe and individualized instructional approaches when leading group cycling
- Effective use of ride formats and intensity training to maximize workouts
- Correct application of power to optimize training on the indoor bike
- Advanced technology to revolutionize how data is displayed, applied and recorded

THE KEISER INDOOR BIKE

Before riding the Keiser M Series Indoor Bike, it is beneficial for an instructor to understand all of its components and features. Each component was built with a purpose and enhances the rider's overall cycling experience.

M3i

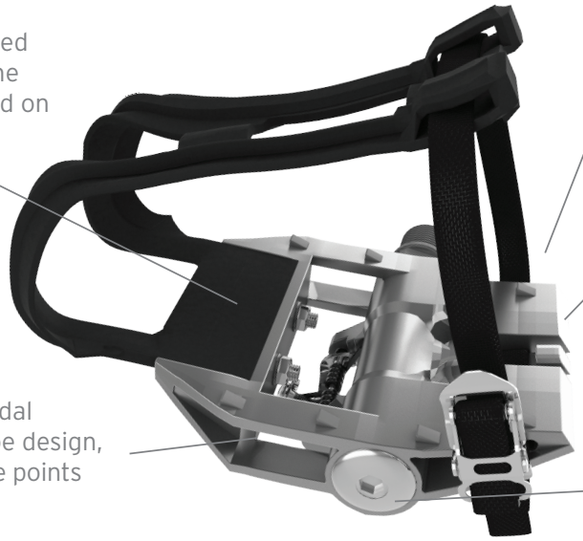
M3

Before getting started, riders should identify which Keiser M Series Indoor Bike model they are riding. Although many of the features are the same, there are some slight differences.

1. **Saddle**
2. **Forward/Backward Seat Adjustment T-Handle**
3. **Seat Adjustment with Pull-Pin**
4. **Wheel Guard**
5. **Flywheel**
6. **Base**
7. **M Series Computer**
8. **Resistance Shifter**
9. **Up/Down Handlebars Adjustment with Pull-Pin** (Pull-Pin Shown)
10. **Forward/Backward Adjustment Lever**
11. **Multi-Placement Handlebars** (Adjustable Fore/Aft Handlebars Shown)
12. **Crank Arm**
13. **Water Bottle Holder**
14. **M Series Bike Pedal**
15. **Pedal Strap**
16. **Transport Wheels**
17. **Left Adjustment for Leveling**
18. **Stretch Pad**
19. **Media Tray**

KEISER M SERIES BIKE PEDAL

As indoor group cycling grew in popularity and the demands on bikes increased, the need for a more user-friendly, yet more durable commercial-grade pedal became clear. For these reasons, Keiser introduced and currently uses the M Series Bike Pedal.



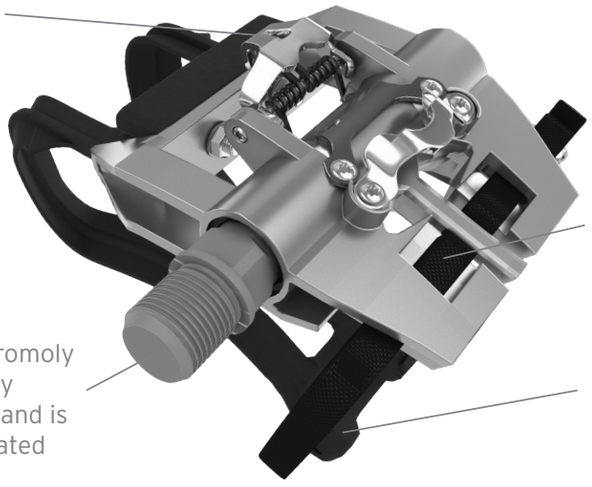
The cage is integrated into the design of the pedal, not just added on

Ramped barbs allow for secure foot placement without insertion difficulty

Pronounced edge allows rider to easily flip pedal and insert foot

Curvature of the pedal matches typical shoe design, eliminating pressure points on the rider's foot

Stronger bearings tested for static and dynamic loads experienced when rider gets on and off, and during rides



Easily accessible SPD tensioning adjustment

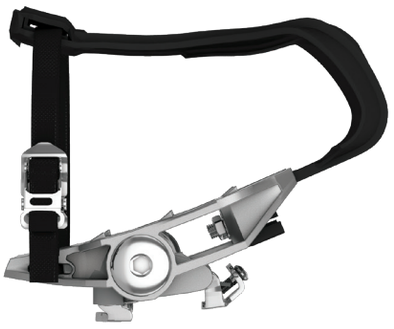
Secure strap design to prevent slipping when tightening, as well as excessive wear

The flexible, forged chromoly steel-axle design evenly distributes stress load and is machine- and heat-treated for maximum strength

Re-angled SPD clip position provides greater clearance between the cage and the ground when using the SPD clips

PEDAL STRAP

The strap on the Keiser M Series Bike Pedal helps to create a snug fit for the rider's foot once the foot is placed correctly on the pedal and in the cage. To tighten the strap, ensure that the strap is not threaded through the second cutout. Pull up on the strap to create a snug fit. Once a desired tightness is achieved, the strap can then be re-threaded through the second cutout. To release, lift up on the clip.



KEISER TECHNOLOGY

MAGNETIC RESISTANCE

The "M" in M Series refers to the eddy current magnetic resistance used in all of the Keiser M Series products.

M5i
STRIDER

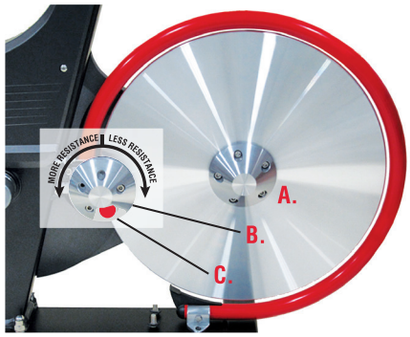
M3i
TOTAL BODY TRAINER

M7i
WHEELCHAIR ACCESSIBLE TOTAL BODY TRAINER

M3i
INDOOR BIKE

EDDY CURRENT MAGNETIC RESISTANCE

An eddy current is an electric current in a conducting material that results from induction by a moving or varying magnetic field. In the M Series, the eddy current is generated by the flywheel passing through two opposing magnets. The flywheel (a conductor) passes through the magnetic field generated by the two powerful magnets located in the magnet housing. By increasing or decreasing gears, the rider is varying how much of the magnetic field comes into contact with the flywheel, thus increasing or decreasing the amount of resistance accordingly. The magnetic resistance also allows the cyclist to enjoy a smoother, quieter and more predictable training session.



A. Flywheel
B. Rotating Magnet Housing
C. Cutaway Revealing Magnet

KINETIC ENERGY

In physics, the kinetic energy of an object is the energy that is created due to its motion. Kinetic energy is defined as the work needed to accelerate a given mass from rest to its current velocity. Upon equalizing this energy during its acceleration, the body of mass maintains this energy unless its speed changes. The formula for kinetic energy is mass multiplied by velocity^2, divided by 2. The standard unit measurement of kinetic energy is the joule.

KINETIC ENERGY (measured in joules) **= (MASS X VELOCITY^2) / 2**

CONCEPT APPLICATION:

Here's a bit of helpful information you can share with participants, perhaps during the warm-up:

"Did you know the flywheel on your bike is set between two opposing magnets? Keiser was the first company to use eddy current magnetic resistance in indoor cycling. When you change gears, more (increase gears) or less (decrease gears) of the magnet is exposed to the flywheel – that's what generates the feeling of resistance as you pedal. Magnetic resistance also creates a smoother, quieter ride. Let's try it together now!"

KEISER M SERIES COMPUTER

The M Series computer is a powerful teaching and programming tool because:

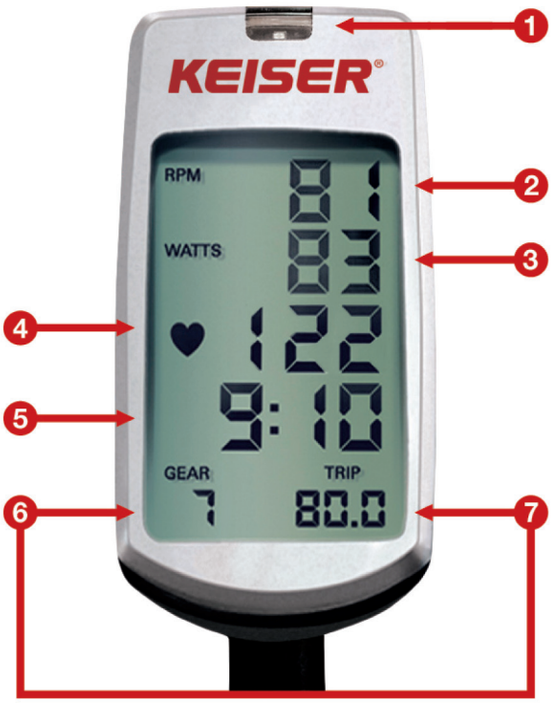
- It provides immediate feedback by displaying various metrics
- The feedback can help engage and motivate the rider
- It helps track a rider's ongoing changes and improvements from workout to workout
- It can create a better workout overall
- It is an important teaching tool to assist the instructor

By cycling within safe cadence parameters, increasing the amount of power generated, observing net calories expended and recognizing heart-rate variability, riders will benefit from a better and more effective workout.

When riders have a strong understanding of the components of a proper workout, they are better equipped to fine-tune their session. The motivation of the computer display is an important element in class design. When used correctly by the instructor, this data provides helpful information by engaging and challenging riders in each workout.

M3 AND M3i COMPUTER FEATURES

Feature	M3	M3i
Backlit Sensor	Yes	Yes
RPM	Yes	Yes
Watts	Yes	Yes
Kilocalories	Yes	Yes
Heart Rate	Heart symbol shows	Heart symbol shows when wearing an HR monitor
Elapsed Time	Yes	Yes
Gear	Yes	Yes
Odometer	Trip distance	Accurate miles or kilometers
Reset to Zero (with lever change)	Yes	No
Reset to Zero (after 1 minute of no pedal activity)	Yes	Yes
Average Calculations	Yes – averages are shown when pedaling stops	Yes – averages are shown at the conclusion of each interval
Intervals	No	Yes
Bluetooth® Compatibility	No	Yes



1 Backlit Sensor

While the M Series Computer is awake, the Backlit Sensor automatically detects ambient (low) light levels and turns on the backlit display.

2 RPM (Revolutions Per Minute)

The RPM display counts the cyclist's revolutions per minute on one crank arm. RPM is known as cadence and is the speed at which the cyclist is riding. Keiser recommends that cyclists pedal between 60 to 110 RPM.

3 Power and Energy (Watts and Kcal)

The power output is displayed in Watts and kilocalories. The computer toggles back and forth between displaying Watts for eight seconds and kilocalories for two seconds.

4 Heart Rate

If there is no heart-rate signal, a steady heart symbol and a zero will be displayed on the M3. If a rider is wearing a heart-rate strap, once the computer locks onto the signal, the heart symbol will blink and display the heart rate. When riding the M3i, no heart-rate symbol will be displayed on the computer unless a heart-rate monitor is worn. The heart-rate strap must be Gym Link compatible; for example, a Polar® H1 or H7 heart-rate strap.

5 Elapsed Time

The number shown on the computer displays the total time spent cycling and will reset to zero after 60 seconds of inactivity (or if the computer on the M3 is reset using the gear shifter).

6 Gear

Gears range from 1 through 24 and are displayed on the bottom left corner of the screen.

7 Odometer/Trip Distance

For the first eight seconds when the computer is initially activated, the odometer will display the total distance the bike has been ridden. This feature is for service and maintenance purposes only. After eight seconds, the odometer will disappear on the M3i and the trip units will display "USA" for trip distance set to miles or "EURO" for trip distance set to kilometers. As soon as the units disappear, trip will display for the remainder of the workout. On the M3, trip distance is calculated based on RPM — approximately 200 revolutions equal 1 trip distance. The odometer on the M3i is accurate in either measurement based on the accuracy of the power output and using an algorithm to make the conversion.

Average Calculations

On the M3i, average RPM, power and heart rate are shown at the conclusion of each interval during the ride. To view averages on the M3, pedaling must be stopped for three seconds. To activate, slow down and stop pedaling. Wait three seconds. The computer will flash the calculated averages until pedaling resumes or until the computer is inactive for 60 seconds.

Resetting the Computer

On the M3 only, calculated averages can be reset using the gear shifter. During the ride, slow down and stop pedaling for three seconds and the averages (RPM, Power, HR) will flash. While averages are flashing and the pedals are motionless, move the gear lever from bottom to top quickly two times. This action will reset ride information back to zero. When either the M3 or M3i pedals are motionless for one minute, the computer will reset to zero.

Batteries

Batteries must be changed when display indicates "Low Battery."

TIMED-INTERVAL FEATURE

The computer is capable of handling multiple timed intervals during a ride. An interval is the time between the start and the end of a defined set. An instructor can choose how long they would like an interval to be and have participants switch from seeing the cumulative (running) time on their computers to working within a specific (timed) interval.

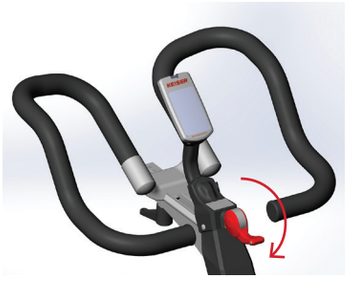
Using the interval feature on the Keiser indoor cycle is an excellent way to: 1) encourage riders to work at a specific intensity for a defined amount of time and 2) use the information from each set as a comparative tool.

For example, an instructor may choose to ask participants to repeat three 30-second work intervals. The instructor can cue riders to start an interval (see explanation below). As riders end each interval, they can observe their data and use that information to decide how they want to approach the next set. At the completion (interval end) of any timed-interval, the computer will display the averages from the set. This information is shown for 10 seconds. After 10 seconds, the computer will return to displaying the running and real time information as gathered throughout the ride.

A rider can set an interval at any time, for any duration of time. However, it is generally the instructor who will provide guidance on the duration and focus for the interval(s).

Starting an Interval

Once an interval is started, interval time 00:00 will appear after 5 seconds.



1. Quickly drop the shifter to gear 1 from a higher gear.

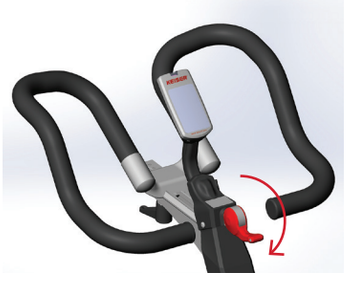
2. Pause for 1/4 second and then move the gear shifter up. This will start the interval.

3. The computer will display "inL #" confirming the interval has started.

At the conclusion of the entire workout, cumulative averages will be displayed using the information from the entire ride.

Stopping an Interval

Once an interval is ended, the averages data will blink for 10 seconds before returning back to displaying running (cumulative) time.



1. Quickly drop the shifter to gear 1 from a higher gear.

2. Pause for 1/4 second and then move the gear shifter up. This will end the interval.

3. The computer will display "inL end" confirming the interval has ended.

ADVANCES IN TECHNOLOGY

Riders who are fully engaged in an indoor ride experience will benefit by getting fit and healthy while strengthening their commitment to exercising. Using technology is a great way to keep riders focused and motivated. The Keiser M3i contains a Bluetooth® transmission chip. This feature allows the bike to be paired with various devices, tracking and projection systems. A projection system can display all the riders' data on a larger screen and apps can be used for personal or group tracking.

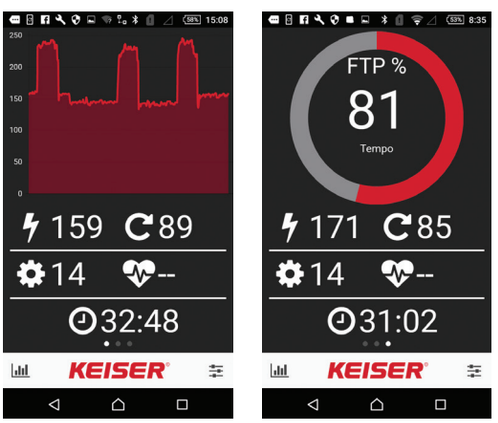
As an instructor, your facility may or may not have access to a projection system or other devices. However, instructors and participants can access Keiser's complimentary mobile apps.

Benefits include:

- **Engagement –** Riders are focused
- **Motivation –** Inspires riders to cycle harder
- **Improvement –** Provides instantaneous feedback
- **Competition –** Creates friendly competition
- **Retention –** Keeps riders intrigued
- **Results –** Feedback shows improvement

KEISER MOBILE APPS

The Keiser M Series applications allows for the collection of data from Keiser M series cardio equipment using a cell phone or tablet. Data can be analyzed within the app or exported as a TCX formula for analysis by other tools. Instructors should encourage participants to download the free apps as they can be used as an instructing and motivational tool.



The M Series App is a free app and available for Apple® and Android™ devices. This app allows users to use features such as Free Ride and FTP testing or follow along with pre-designed workouts. The app will collect and allow the data to be exported and downloaded.

The free M Series Instructor App allows instructors to gain a greater understanding of their riders' performance. The app allows instructors to easily view all M3i Indoor Bikes in a class in a single list, with options to sort and view live data – and does not require any additional hardware. The app also collects data for each rider and allows the instructor to export a simple text file that outlines any rider's averages and time.

Metrics is Keiser's cloud platform, which combines data from both M Series and strength equipment into a single user profile. There are downloadable apps available on Apple and Android, as well as the web app available at metrics.keiser.com. The current system supports creating individual accounts, and then syncing data from the M Series app and pulling in data from the eChip.

Both apps now have Metrics integration and will have a splash screen that appears upon initial launch to direct users to the sign-up screen. Once connected to Metrics, the app will sync all workout sessions with Metrics, allowing users to see their workouts within the Metrics app. This also allows users to move to other devices and not lose any of their workout sessions. Once synced, that data will show up on all of their devices, both within the M Series app and the Metrics app.

SUMMARY TO SUCCESSFUL M SERIES APP INTEGRATION

1. Identify the Keiser indoor cycle as an M3i (the M3 is not Bluetooth enabled)
2. Download the Keiser app (on an Apple and Android device or tablet) via the App Store® or Google Play™
3. Ensure each bike has been set up with a bike identification number
4. Ensure Bluetooth is enabled on the user's device
5. Open the app
6. Begin cycling and select bike ID
7. Choose the equipment type (M3i)
8. Choose type of ride (Free Ride, FTP Test or Guided)

BIKE IDENTIFICATION

Before getting started, riders must identify which bike they are riding. For the first revolution of the pedal during start-up, Lines 2 and 3 will display "bid" (bike identification) and any number from 0 to 150. If set up correctly in a group cycling environment, bid represents an identifiable numerical value specific to each individual bike.

KEISER PROJECTION SYSTEM

The Keiser Projection System projects information from each rider's M3i bike onto a screen. Not all facilities will have purchased a projection system, but projection systems are available from Keiser and other companies that offer similar technology.

HOW IT WORKS

Component: **Bluetooth® Technology**
Outcome: **Transmits the data**

The Keiser M3i uses Bluetooth smart technology and can transmit rider data to multiple devices at once. Riders can use their own apps to collect data while still participating in the class.

Component: **IPS Hardware**
Outcome: **Collects data**

The IPS Graphics Generator Unit collects data from every bike in the room and tracks each rider's performance throughout the class.

Component: **The Instructor**
Outcome: **Guides the class**

Using a remote, the instructor has control over the visual presentation of data displayed. Instructors can control and change the various screens to best connect with the desired drill or outcome.

Component: **Summary Screen**
Outcome: **Shows the results**

At the end of each class, riders have an opportunity to see their ranking and their team's final ranking.

THE M3i IS CURRENTLY COMPATIBLE WITH:

iQniter cardio training Powered by SUUNTO
Performance IQ MOTIVATION THROUGH MEASUREMENT
HEART ZONES
ACTIVIO
SPIVI
FITMETRIX
BKOOL Connect | Sport
MYZONE

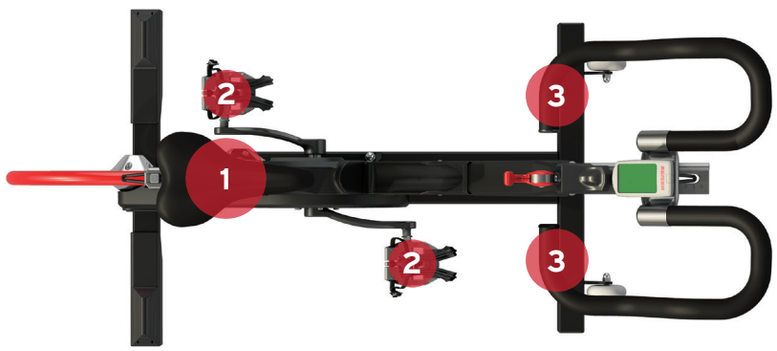
BIKE SET-UP

Before starting a cycling class, it is the instructor's responsibility to make sure each participant is set up correctly and properly positioned on the bike. The instructor may lead the set-up with the group – or individually. Taking time to make sure each rider is comfortable on his or her bike is the first step to a successful workout. If bike positioning is incorrect, performance may be compromised and the risk of injury increases.

- As participants arrive in the studio and locate their bikes, assist both new and returning riders with proper bike set-up
- To safely get on and off the bike, place the gear lever in the position of greatest resistance (highest gear)
- While making adjustments, the instructor may adjust the rider's bike with the participant off the bike or while the rider is in the standing cycling position
- If the participant is adjusting his or her own bike, ask him or her to dismount to make set-up adjustments

POINTS OF CONTACT ON THE INDOOR BIKE

There are three main points of contact on the bike – saddle, pedals and handlebars.



1. **Saddle**
2. **Pedals**
3. **Handlebars**

ADJUSTMENT POINTS ON THE INDOOR BIKE

There are 5 adjustment locations on the M Series Indoor Bike.

1. **Seat-Post Height** (raise or lower)
2. **Saddle Fore and Aft** (slide forward and backward)
3. **Handlebars Height** (raise or lower)
4. **Handlebars Fore and Aft** (slide forward and backward)
5. **Cages** (tighten or loosen)

ADJUSTMENT LEVERS

The M Series Indoor Bikes have various adjustment levers (i.e., L-levers, C-clamps, pull-pins) depending on the model being ridden. Regardless of the type of lever, it is important for the instructor and rider to familiarize himself or herself with each of the tightening mechanisms on the bike. Once a rider is correctly set up on the bike, double check that all adjustment levers are snug and secured.

PULL-PIN ADJUSTMENT MECHANISM

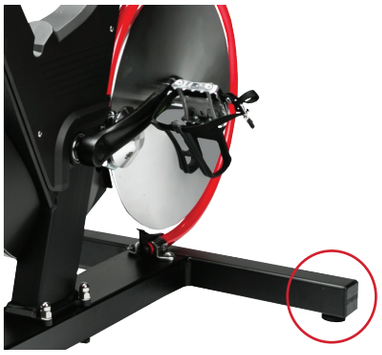
When using a pull-pin mechanism, turn the plunger counter-clockwise until it loosens. Pull the plunger slightly out. While holding the plunger, raise or lower the seat or handlebars post to reach the desired position. Re-engage the plunger ensuring that it locks into the desired hole in the seat or handlebars post. Turn the plunger clockwise until it is hand tight. Check the seat or handlebars post to ensure it is secure. There should be no movement of the seat or handlebars in any direction.

EMERGENCY BRAKE POSITION

The resistance shifter allows the rider to safely slow or stop the motion of the flywheel. Move the resistance shifter up to increase the gear and slow the motion of the flywheel. This method can also be used as an emergency operation to stop the motion of the flywheel. To use the resistance shifter as an emergency brake, move the lever all the way up to stop all motion within one revolution. With any braking procedure, wait until the pedals and flywheel come to a complete stop before dismounting.

LEVELER ADJUSTMENT

The leveler foot is located on the left rear corner of the base frame. The leveler foot can be adjusted by slightly lifting the appropriate corner of the bike and screwing the foot clockwise or counter-clockwise. If the bike requires leveling, rotate the foot inwards (or counter-clockwise from a top-side view) until the bike is resting on the three fixed feet. Next, with the bike resting on the three fixed feet, rotate the leveler foot out (or clockwise from a top view) until it just comes in contact with the floor. Test the bike for stability and fine tune or adjust the leveler foot as needed.



KEISER M SERIES SET-UP

SADDLE POSITION – SEAT POST HEIGHT

- Although there are many ways to determine correct seat height, the goal is to efficiently find a starting point. Once a rider begins to cycle, further adjustments may need to be made
- Start with the rider standing close to and beside the saddle
- To begin, first establish the height of the saddle
  - Landmark the top of the saddle so that it is level with the iliac crest
  - The iliac crest is the highest point of the hip bone

Another method for finding seat height is to lift the knee and bring the thigh horizontal.

- Landmark the seat to be level with the top of the leg

- Next, place the handlebars slightly above the saddle height and keep the gear lever at the highest gear
- Ask the rider to sit on the saddle and place the ball of each foot over the center of the pedals. Because the cages are made for various foot sizes, refrain from pushing the toes to the end of the cage. If cycling shoes with SPD-compatible clips are worn, clip into the pedals.
- Release the heavy resistance and, with a low to moderate gear, have the rider turn the pedals at a slow pace
- The hands should remain in a comfortable position on the handlebars
- Note seat height in relationship to knee bend
- As the knee extends into a straight line, there should be a bend at the knee
- A knee extension of approximately 35° (the angle of deviation from a straight leg) is optimal for most riders

SADDLE POSITION – FORE AND AFT

- Ask the rider to bring the right foot halfway down (at the 3 o'clock position with the crank arms parallel to the floor) and keep both pedals level
- With the hands remaining on the handlebars, the front of the knee should be in line with the center of the pedal where the pedal attaches to the crank arm
- If the knee is in front of the pedal-attachment bolt, move the saddle back
- If the knee is behind the pedal-attachment bolt, move the saddle forward
- Adjust and re-check the front of the knee alignment

HANDLEBARS – HEIGHT AND FORE AND AFT POSITION

- When first positioning the handlebars, the lowest part of the handlebars should be slightly higher than the saddle height
- Handlebars positioning may also be affected by low back flexibility, hip flexibility and core stability and may change as mobility or stability improves
- Adjust the handlebars until neutral spine is comfortably achieved while pedaling
- New riders or riders who have difficulty maintaining a forward flexed position may prefer to have their handlebars slightly higher
- Outdoor cyclists may want to adjust the handlebars to mimic their outdoor training. Allow them to drop their handlebars to a position no lower than the tip of their saddle.
- Keiser's handlebars are not meant to replace the drop-down position on an outdoor bike. Placing the handlebars too low may result in the participant's knees hitting the handlebars or arms.

- Hinging forward from the hip with a neutral spine, place the hands in the hook grip (second) position
- Ask the rider to pedal for 10–15 rotations to ensure ability to maintain a neutral spine position while pedaling
- Next, ask the rider to neutralize the shoulder girdle (collar bones wide and horizontal, shoulder blades flat against the ribcage); then adjust handlebars fore and aft positioning
- The elbows should be slightly bent while maintaining a neutral spine. Slide the handlebars in or out as needed.

FOOT PLACEMENT – CAGES

- To complete bike set-up, ensure the foot is in the right location on the pedal
- Always secure the pedal-clip strap by placing the widest part of the foot on the pedal and within the toe cage. This positioning is applicable when not using the Keiser M Series Pedal.
- Locate the strap and pull on it to tighten. It should be snug, but not too tight to cause discomfort.

Incorrect placement

Correct placement

Finish by threading the strap through

FINAL STEPS

- Ask the rider to pedal at a moderate speed and gear
- From behind the rider: Observe the rider's hips. If the hips are rocking back and forth in the saddle, the saddle position may be too high. Uneven rocking from side to side may result in hip or back injuries.
- Facing the rider: Observe whether the rider is pedaling with the knees bowed outward (beyond their normal ergonomic position) indicating the saddle may be too low. Extensive knee flexion places unwanted stress on the patella.
- From the side: Observe the rider's upper-body positioning, the amount of flexion at the knee and the foot. Make adjustments as needed.
- When participants begin riding with intensity, they will often shift their body to a more comfortable position on the saddle. Therefore, it may be necessary to re-check and adjust fore and aft position later into the ride.
- Ensure riders understand the correct positioning identifiers. That way, they can adjust their own bike if they start to sit on the saddle differently or have a change in mobility and/or stability.
- Further adjustments will depend on personal preference and experience level of the rider
- Remind riders to check that all adjustments levers have been correctly tightened to avoid the seat or handlebars slipping out of position
- Riders are encouraged to remember their seat and handlebars post, fore and aft, and height markers for future classes

QUICK TIPS FOR SET-UP

1. Introduce yourself and ask riders to stand beside their bike
2. Adjust the saddle height to be at the height of the iliac crest or level with the top of the thigh
3. Raise the handlebars slightly above the height of the saddle
4. Shift the gear lever to a high gear and ask the rider to sit on the saddle
5. Place the widest part of the foot on the middle of the pedal on bikes not using the M Series pedal
6. Place hands in most comfortable riding position
7. Rotate the pedal to the bottom position, crank arms perpendicular and check the amount of flexion at the knee, observing for a slight knee bend
8. Check fore and aft positioning of the saddle with the pedals in a parallel position; the front of the knee should be in line with the widest part of the foot
9. Check height and fore and aft position of the handlebars in order to maintain neutral spine
10. Decrease gear and ask rider to cycle and comment on comfort
11. Re-check that all adjustment levers have been tightened and that the cages are snug around the foot (if cycling shoes are not worn)

POSTURE

As in any activity, proper posture is extremely important. It is recommended that riders assume a neutral riding position. There is no need to compromise neutral spine in order to gain an "aerodynamic" advantage in a simulated workout environment. Our role as fitness professionals is to help enhance our riders' path towards wellness. By keeping them in a neutral position, we can help train them to maintain correct posture throughout the day.

- Proper posture means engaging the core abdominal muscles and breathing through the diaphragm
- Preferred position for indoor cycling is to maintain neutral spine, with a slight arch in the lower back
- When seated on the bike, hinge at the hips and maintain a neutral position. This position is referred to as "hip hinge."
- The thoracic spine also needs to remain neutral. Cue riders to lengthen their spine and keep the shoulder blades flat against the ribcage and the collar bones open and wide.
- By emphasizing this position throughout the class, riders will learn to avoid rounding the spine forward during higher intensities

Neutral Spine

Hip Hinge

Seated Hip Hinge

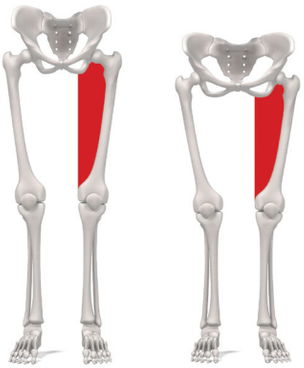
In fitness classes, the axiom "pull your belly button to your spine" is often used incorrectly. Because the goal is to protect the lower back, this cue is actually ineffective when applied to indoor cycling and typically leads to lumbar flexion. Standing sideways to a mirror or lying on the floor, try the following positions: anterior pelvic tilts, posterior pelvic tilts and neutral spine. Notice how the body looks and feels when it is in each of the positions. The goal is to find and maintain neutral spine in each riding position and for the length of the class. Core stability plays a major role in maintaining neutral spine. The core muscles are divided into the inner unit (or inner core) and the outer unit (or outer core). The inner unit muscles consist of the transversus abdominus, the diaphragm, the multifidus and the pelvic floor muscles. These muscles are pelvic stabilizers. The outer unit muscles include the internal and external obliques, gluteus medius, minimus and maximus, and the erector spinae.

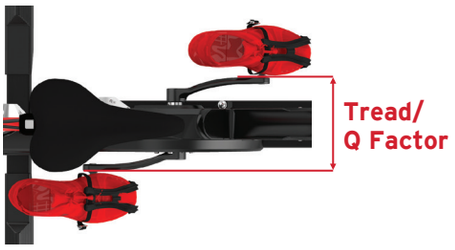
- Cue riders to activate the inner unit at a level that keeps their sacrum stable while riding
- Observe how the cycling movement comes from the hips versus the low back, waist or pelvis when the core is kept engaged
- In a more aggressive riding position, riders will need to increase their core activation
- Remind beginners or those with weaker core muscles that they may need to take breaks in position until their core strength improves or they may feel their lumbar spine arch and/or low back muscles take over or fatigue

Q ANGLE AND Q FACTOR

Q Angle represents the degree of angle formed between the quadriceps and the patellar tendon. Because women have wider hips, they tend to have a wider Q Angle. The angle is measured when the foot is in the bottom-center position of the pedaling stroke or assessed while looking at the knees from the front while standing. There is no scientific data that suggests an ideal angle in relation to indoor or outdoor cycling.

Q Factor (also known as Tread) represents the distance between the two pedal cranks on a bike. Q Factor separation varies from bike to bike. For example, indoor bikes, road bikes and mountain bikes will all have slightly different Q Factors. Road riders with narrower hips may prefer a smaller Q Factor in order to generate more power. However, participants in indoor cycling classes come in all shapes and sizes. Keiser chose a Q Factor to best represent the majority of indoor cyclists. Regardless of Q Angle or Q Factor, alignment is key and instructors should always cue riders to maintain a proper alignment from the hip to the knee to the second toe.





POSITION ON THE SADDLE

Keiser designed its bike saddle with a rider's comfort in mind. Finding a comfortable position in the saddle may initially be challenging for some riders. However, correct positioning plus logging riding time will help. The ischial tuberosities (the SIT bones) tend to be more widely spaced in women than men. Therefore, men and women find comfort differently on the saddle. Ideally, the widest part of the saddle should support the SIT bones and the front of the saddle (the narrow part) is meant to help control the riding position. The nose of the saddle may bother riders the most if it compresses nerves or irritates the soft tissues. To help riders find greater comfort, remind riders to align their SIT bones back over the saddle, to maintain a neutral pelvic position and to take breaks as needed (i.e., go into a standing climb). Cycling fast and out of control may also cause greater discomfort due to the amount of uncontrolled bouncing that can occur while seated. Remind riders to ride with control. Cycling shorts or gel seat covers may also help.

HAND POSITIONS

When placing the hands on the handlebars, it is important to find a position that is most comfortable for the rider. Include a variety of grip positions in combination with the cycling postures to both add variety and avoid wrist and hand discomfort.

HAND POSITION 1
Overhand or Front Grip

- Hands rest on the handlebars in a comfortable and neutral position with a slight bend at the elbows
- Wrists should be straight and thumbs over the bar

Used for Seated Flats and Seated Climb

HAND POSITION 2
Hook or Middle Grip

- The fleshy part of the hand located between the thumb and first finger is placed near the hook of the handlebars
- Elbows are slightly flexed, avoiding external rotation
- Maintain a comfortable and secure grip
- Ideal position for adding resistance and well-suited for good control of the upper and lower body
- Ideal for power transfer while minimizing upper body movement

Used for Seated Flats, Seated Climbs, Standing Climbs and Lifts

HAND POSITION 3
Extended Grip

- The hands are extended along the furthest part of the handlebars
- Arms are parallel and elbows relaxed, slightly flexed
- Hand grip is light and not over the end of the handlebars

Used for Standing Climbs and Lifts

HAND POSITION 4
Time Trial

- The elbows and hands are held in a relaxed position
- Elbows and forearms should ideally hover over the handlebars
- If a rider has poor form or feels that the position is too constricting, opt for Position 3

Used for Seated Flats and Time Trialing

RIDING POSITIONS

It is not necessary to memorize hundreds of body positions and grips. Instead, it is more important to have good positioning and control of both the upper and lower body within the following postures:

1. BASIC

Cadence: 60-110 RPM

Overview: When seated on the bike, body weight should be evenly distributed across the saddle, handlebars and pedals. The basic posture serves as a point of reference for all other positions.

- Shoulders, neck and arms are relaxed
- Proper alignment is kept through the wrists
- Shoulder girdle and cervical spine are in neutral alignment
- Pelvis is in a neutral position and the rider is activated through the core
- The rider's feet are in contact with the pedals
- Knees are parallel and in line with the second toe

2. SEATED CLIMB

Cadence: 60-90 RPM

Overview: Seated climbing is the rider's first taste of climbing a simulated hill.

- Adding moderate to heavy gears automatically forces riders to shift slightly towards the back of their saddles
- The upper body should remain relaxed with hands lightly gripping the handlebars. The amount of force required for the grip should be minimal.
- A hook complements this position

3. STANDING CLIMB

Cadence: 60-90 RPM Heavy Climb: 60-75 RPM Faster Climbs: 75-90 RPM

Overview: In standing climb, riders gear up to a higher resistance and transition to a standing position. There is a natural and slight body sway to create momentum and to power each pedal stroke.

- Keep each pedal stroke smooth and fluid
- Keep the center of gravity low in the body so very little body weight is placed on the handlebars
- The rider's movement should be controlled while weight is over the pedals to add torque and power
- Riders should feel the nose of their saddle on each pedal stroke. The hips remain level and facing forward.
- Cadence speed of 60-90 RPM is recommended for climbing; varying from heavy to light resistance
- Heavy climbs require that the weight be shifted back, with RPM from 60-75
- Faster climbs require the weight to be shifted slightly forward and to the middle of the saddle with 75-90 RPM

4. LIFTS

Cadence: 70-90 RPM

Overview: Lifts are advanced postures. Riders will be alternating from seated to standing positions at their own pace. The goal of the lifts is to take full advantage of body weight and strength.

- Resistance is moderate to heavy
- Cue riders to maintain correct posture while lifting their glutes back off the saddle rather than straight up, keeping the center of gravity low and back
- Hands should be positioned on the handlebars where they curve up (extended grip) or a simple overhand grip
- Shoulders stay behind the elbows
- No weight should be on the handlebars
- The nose of the saddle should graze the inner thighs with each pedal stroke

5. TIME TRIALING

Cadence: 90-100 RPM

Overview: The time-trialing posture allows cyclists to ride slightly faster.

- Rider's body is low and in a neutral position
- The shoulder girdle and cervical spine (neck) are in neutral alignment
- Hands are positioned in an extended or narrow position with the elbows raised slightly off the handlebar
- Rider's body weight is shifted slightly forward

SUMMARY

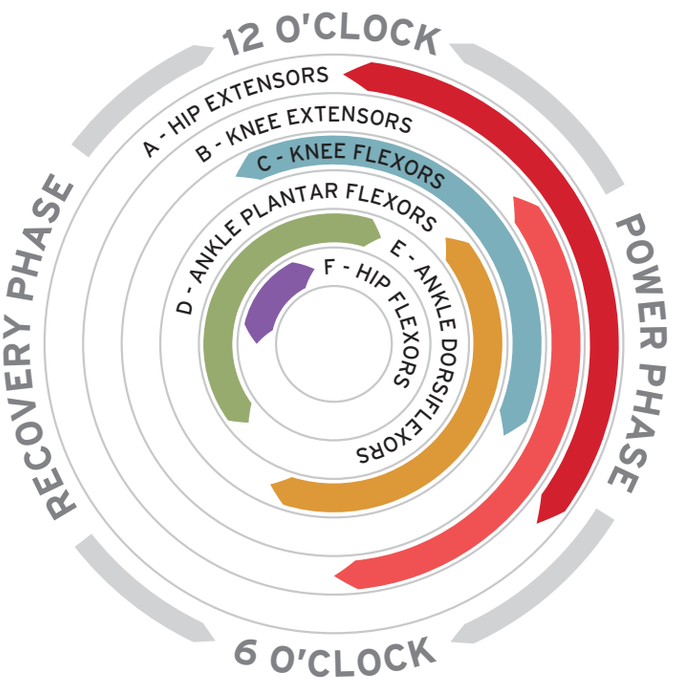
Riding Position	Cadence	Hand Position
Basic	60-110 RPM	Overhand Middle Grip
Seated Climb	60-90 RPM	Overhand Middle Grip
Standing Climb	60-90 RPM Heavy Climb: 60-75 RPM Faster Climb: 75-90 RPM	Middle Grip Extended Grip
Lifts	70-90 RPM	Middle Grip
Time Trialing	90-100 RPM	Time-Trial Grip

THE SCIENCE OF PEDALING

The pedaling motion in cycling utilizes a series of muscle contractions and relaxations that must be coordinated and synchronized. Correct pedaling must be learned and practiced repeatedly to become effective and automatic.

- The legs should move within two parallel planes
- During pedaling, the muscles in the legs are the main contributors to the movement
- The muscles in the rest of the body work in an isometric manner (except during specific actions such as a standing climb) and stabilize the body's position while maintaining balance
- The main leg muscles that contribute to the pedaling stroke are the hip extensors (gluteus maximus, hamstrings), knee extensors / quadriceps (rectus femoris, vastus medialis, vastus lateralis, vastus intermedius), knee flexors / hamstrings (biceps femoris, semimembranosus, semitendinosus), ankle plantar flexors / calf muscles (gastrocnemius, soleus), ankle dorsiflexors (tibialis anterior), and hip flexors (ilipsoas, sartorius, and rectus femoris)

MUSCLE CONTRIBUTION IN THE PEDALING PHASE



A. Hip Extensors

B. Knee Extensors

C. Knee Flexors

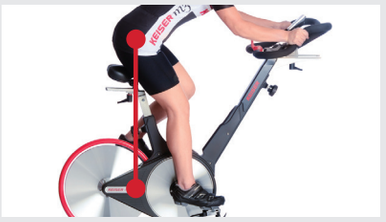
D. Ankle Plantar Flexors

E. Ankle Dorsiflexors

F. Hip Flexors

TIPS AND CUES

- Proper form is important for efficient riding technique, injury prevention, activation of the correct cycling muscles and effective workouts
- Cue riders to pedal in a smooth and balanced way, maintaining a parallel knee position. While seated, keep the knees angled over the feet. Refrain from moving the hips side to side. This movement can affect the knee joint alignment.
- Remind riders to never sacrifice form for speed. Faster doesn't necessarily equate to harder training (refer to the power formula).
- Periodically cue riders to check their form in a mirror. Be sure the knees are over the toes and regularly cue proper posture – maintaining neutral spine with the shoulders and arms relaxed.
- The grip on the handlebars should be light. There should always be hand contact with the handlebars unless riders are drinking water, recovering, warming up or cooling down.
- In standing position, avoid leaning too far forward, especially when using light resistance. Keep the body over the saddle and within the "saddle alignment zone". The saddle alignment zone refers to positioning over the saddle in such a way that there is always some contact.



- Riders should be encouraged to ride at their own intensity and not be concerned with keeping up with the instructor or other riders in the class. Instructors should provide options for riders to cycle at intensities appropriate to their fitness level.

CADENCE (RPM)

An important component of efficient pedaling is cadence. Cadence is the number of pedal strokes that are completed in one minute. This is called RPM (revolutions per minute). A class should include a combination of slow, moderate and fast cadences at various resistances.

CADENCE RANGES

SLOW
60–80 RPM

MODERATE
80–100 RPM

FAST
100–110 RPM

INSTRUCTING WITH GEARS

Finding the correct gears to meet the rider's workout needs requires an individualized approach. Ideally, each rider should gauge his or her personal intensity based on individual exercise goals at specific points throughout the workout. The Keiser indoor cycle is based on 24 gears and goes from gear 1 (lightest) to gear 24 (hardest). For those riders who prefer specific numbers, the following gear ranges are recommended. Note that these are suggested ranges. Remind riders to establish gears based on their current fitness level, goals and ability. It is important to always cue gear ranges and not "exact" gears. For example, some riders may warm up at gear 5 and some may prefer gear 10. Therefore, a range will cover all riders and their varied abilities.

GEAR RANGES

1-5
Introduction
(prior to class starting)

5-10
Warm-Up

8-12
Easy Flat

10-14
Hard Flat

12-16
Easy Climb

14-18
Hard Climb

16-24
Very Hard Climb

ENERGY SYSTEMS

Having a base understanding of the body's energy systems is important for selecting the best type of drills and training for a cycling workout. Prior to the contraction or shortening of a muscle, adenosine tri-phosphate (ATP), which is stored or synthesized in muscle cells, is broken down so energy can be released. ATP is immediately available to the muscles and contributes to the three main energy systems called the ATP-CP, Anaerobic Lactic Acid and the Aerobic Systems. The contribution to ATP synthesis varies depending on the duration and intensity of an activity being performed. For example, short intense exercise uses the ATP-CP system for energy and longer duration activities rely on the Aerobic System.

1. ATP-CP

- Used during maximal exercise intensity >90% max HR (heart rate)
- Can be initiated instantaneously
- Depleted within approximately 10 to 20 seconds
- Limited supply in the muscles

2. ANAEROBIC LACTIC ACID SYSTEM

- Used during high-intensity exercise >80% max HR (heart rate)
- No oxygen is required so it can be initiated quickly
- Depleted within 60 to 180 seconds
- Lactate by-product of the lactic acid system changes the pH in the muscle, causing fatigue

3. AEROBIC SYSTEM

- Used during lower-intensity exercise <80% max HR (heart rate)
- Oxygen is required to produce ATP in order to sustain muscle contraction during long-duration and endurance exercises
- Activities lasting longer than three minutes

	ATP-CP	Anaerobic Lactic Acid	Aerobic
Energy Source	Stored within the muscle	ATP is produced in absence of O2 (oxygen)	Highly effective energy production using O2 (oxygen)
Power Output	High	Medium	Low
Activation Speed	Immediate	Fast	Slow
Time	10–20 seconds	1–3 minutes	2 hours+
Fuel Source	CP & ATP	Carbohydrates	Fats
Peak Power	1 sec	20 sec	2–3 min
Maintain Peak Power	10 sec	30 sec	3 min
Capacity	6–30 sec	30 sec–3 min	2+ hours
Full Recovery	3 min	1–2 hours	24–48 hours
Half Recovery	20–30 sec	15–20 min	5–6 hours

TRAINING WITH POWER

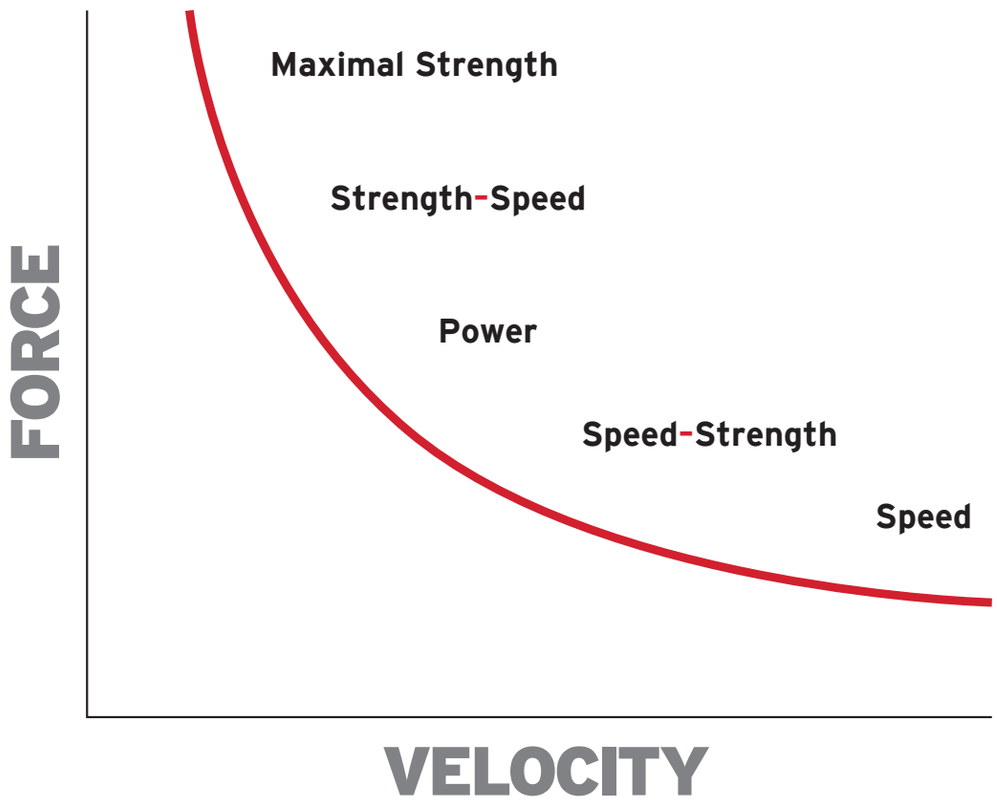
The power formula applied to indoor cycling is as follows:

POWER (measured in Watts) = **FORCE** (gear resistance) x **VELOCITY** (RPM)

WATTS (Power) = **GEARS** (1-24) x **RPM** (60-110)

- Power is the amount of work being done, measured in Watts, by the cyclist in a given amount of time
- Force is the amount of resistance from gear 1 to 24
- Velocity is speed, indicated by the cadence (RPM) at which the rider is pedaling
- Power, speed and force are related. Power measures work intensity and it is modified by the two variables of force and speed (distance/time).

To maximize power output, riders must regulate gear and RPM. While pedaling fast may appear challenging, without any resistance the power output is low. In contrast, pedaling very slowly with high gears may also provide a less than desirable Watts output. Therefore, to maximize power output, manipulation of gear and RPM must be considered. In terms of effort, both components of power must be factored in.



POWER-BASED TRAINING

The concept of training with power for indoor cycling can sometimes seem intimidating or confusing. However, training with power provides tremendous benefits to the rider. Not unlike the model of working in pre-determined and individualized heart rate zones, training within individualized power zones (using Watts) is a similar training concept. The similarities lay in first establishing a baseline starting point, then determining the correct zones to work in based on the goals of a drill, the workout as a whole or the needs of the rider. Having a better understanding of power in relation to Watts, gears, RPM and the physiological response of the body comes with time in the saddle. Once a rider has had a chance to experience the M3/M3i and the associated features outputs displayed on the computer, specific testing strategies can be applied. Power-based training provides an objective measure of fitness progress and is a valuable training tool.

BENEFITS TO TRAINING WITH POWER

Train within specific Watts ranges

Application: Each drill (work and/or recovery) is completed at a pre-determined and set Watts range.

Train to achieve specific Watts goals

Application: Repeat a specific drill (e.g., hill drill) at the same Watts range for two to three sets.

Identify gaps in training

Application: For example, a rider may be strong in short-burst attacks but may be weak during sustained hills as indicated by power outputs.

Receive metabolic feedback from heart-rate data

Application: Fatigue, dehydration or low blood sugar may impact heart rate without impacting Watts.

Gain an understanding of individualized power training zones

Application: Using various power tests to calculate a rider's various training zones.

Equalize all riders with power-to-weight ratio

Application: Determining an individual's power output is based on the formula of Watts divided by body weight in kilograms and not directly calculated as a straight power reading.

POWER ACCURACY – EN957-10 CERTIFICATION

The M3 Indoor Bike was the industry's first group cycling bike to receive the prestigious EN957-10 Certification for power accuracy, safety and environmental friendliness from TÜV Product Services, a European safety organization. The designation assures that while riding an M Series bike the power numbers shown in the display are valid, ensuring an accurate workout. Additionally, the EN957-10 Certification ensures that Keiser's bike designs have met safety and environmental standards.

MEASURING A RIDER'S POWER OUTPUT

Functional Threshold Power

Functional Threshold Power is defined as the highest power a rider can sustain for one hour at a steady rate. A full Functional Threshold test will take 60 minutes. However, 95% of a 20-minute average test correlates closely with a 60-minute test. The results allow riders to calculate and train in various power zones. In addition, shorter power tests may be attempted for a more manageable application in classes. For example, Keiser's Personal Power Test is a shorter-duration test and can be completed as a 3-, 5-, 10- or 20-minute test. When a shorter test is being used, a correction factor must be applied. A correction factor takes into consideration the amount of systemic error that might occur by not doing the full 60-minute FTP test (Allen & Coggan). Thus, average Watts from the shorter test are multiplied by a correction factor between 5% and 20% to determine a final FTP personal score. The correction factor use (i.e., 5%–20%) depends on the duration of the short test chosen.

Here are the suggested Keiser Correction Factors:

3-Minute Test: 20% Correction Factor

5-Minute Test: 15% Correction Factor

10-Minute Test: 10% Correction Factor

20-Minute Test: 5% Correction Factor

Peak Power

Peak Power is the highest power output a rider can achieve. Typically, this is measured by attempting to reach maximum power during a 15-second interval.

Average Power

Short-duration power testing can be completed in one- or five-minute measurements. These results can also be used as baseline and repeatable training goals.

HOW TO INSTRUCT A (FUNCTIONAL THRESHOLD) POWER TEST

The goal of a (Functional Threshold) power test is to encourage and challenge riders to ride at their highest steady state (defined as the highest amount of power a rider can sustain at lactate threshold). To effectively instruct a power test, make sure to:

- Adequately warm up the riders for a minimum of 10 minutes prior to the test starting
- Reset the computer to zero or start a new interval
- Choose drills or instructing strategies that motivate a rider to stay at lactate threshold
- Use words to describe the physiological response at lactate threshold. For example, the rider should visualize that he or she is riding up a steep hill against a heavy headwind.

CONCLUSION OF THE FTP TEST

- Remind riders at the end of the test to remember their calculated average Watts
- The test results go into a formula to determine an individual rider's training zones based on Watts. See test examples and results on the following pages.

5-MINUTE FTP TEST (TOTAL TIME 30')

A 5-Minute FTP Test can be completed using either the Keiser M Series App or through the method described in the section below. Because the data needs to be recorded, a pen/pencil, piece of paper, blank sample test sheet or smart phone to record test results should be easily accessible.

***If you are using an M3, please reset your bike display before you start the test**

***If you are using an M3i, please start the test with your display time counter to 00:00**

WARMING UP PHASE ONE (5')

5' Start pedaling at 80-90 RPM during the warm-up in Phase One. Set power output between 70W and 120W depending on a rider's physical condition.
***At this point, HR should be 60-70% of predicted maximum heart rate (MHR).

WARMING UP PHASE TWO (10')

(Increase 1-2 gear levels)

1' Increase cadence at 100 RPM. Power will increase.

1' Reduce cadence at 80-90 RPM without modifying gear resistance level. Power will decrease.

Repeat for an additional four sets ***At this point, HR should be 75-80% of MHR.

DISPLAY INSTRUCTIONS BEFORE MAIN TEST PHASE STARTS

Immediately after Phase Two of the warm-up ends and before you begin the 5-minute Main Test Segment, keep pedaling and then open an interval lap following the display functions. It will appear as "inL 1" on your screen. You can start your test when the time reads 00:00.

NOTE: All M3 riders, please stop the bike's pedal for three seconds and reset the computer to be sure that all data and time is back to zero.

TEST PHASE (5')

5' At 80-90 RPM, set power output to a maximum level that can be sustained for five minutes with a good pedal technique and safe body position. ***At this point, HR should be >85% of MHR.

After completing the 5-minute Main Test Segment, close the interval lap following the display functions and record the Average Power, HR and RPM shown on the bike's computer.

NOTE: All M3 riders, please stop pedaling for three seconds before recording the average RPM, Power and HR flashing on your bike's screen display.

To calculate your FTP, follow this formula:

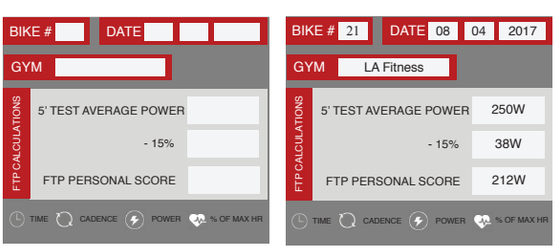
AVERAGE 5' POWER – 15% AVERAGE 5' POWER = FTP
(Correction Factor)

COOL DOWN

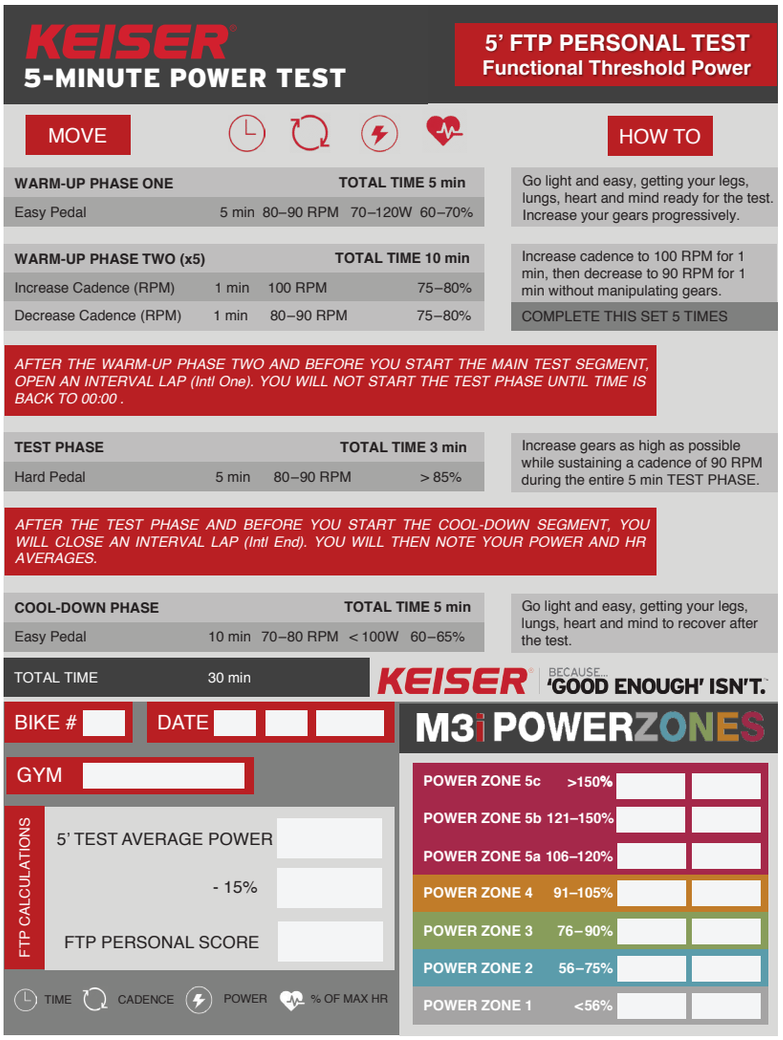
10' At 70-80 RPM, gradually reduce the intensity by decreasing gear levels. Power output should decrease below 100W. ***At this point, HR should be 60-65% of MHR.

5-MINUTE TEST RESULTS

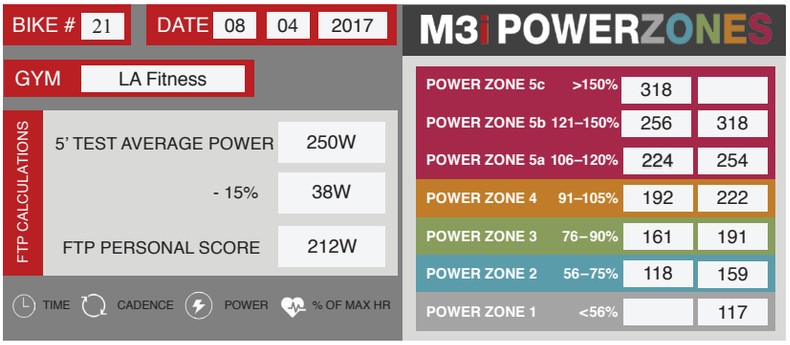
In this example, the client averages 250 Watts. A correction factor of 15% was applied to give this individual a personal FTP score of 212 Watts. 212 Watts will now be used to determine the following Watt ranges for each of the Power Zones.



SAMPLE KEISER 5-MINUTE POWER TEST



Results (Example)



COMPARING POWER OUTPUTS

To determine whether one rider is more powerful than another, the average power calculated from the results of an FTP Test is divided by a rider's body weight in kilograms (Watts/kilogram). Simply assuming that the rider whose computer displays the highest Watts is the more powerful rider is not necessarily correct. Body weight must be taken into consideration.

POWER TRAINING ZONES

Once the power test is complete, the data obtained is used to determine an individual's different power zones and levels. Using Watts, riders can move from one zone to another using the specific physiological adaptations appropriate to the features of each level. The idea of training within Watts zones is similar to the idea of training within heart-rate zones.

TRAINING ZONES DEFINED

ZONE	EFFORT TYPE	RATING OF PERCEIVED EXERTION (RPE)	HEART RATE MAX %	HEART RATE THRESHOLD (FTHR) %	POWER THRESHOLD (FTP) %	HOW DOES IT FEEL?
1	Active Recovery	<2	50-60	<69	<55	• Easy • Light pedal pressure • Minimal sensation of leg effort/fatigue • Used for active recovery after strenuous training day
2	Endurance	3-4	60-70	69-83	55-75	• All-day pace or long slow endurance training • Sensation of leg effort/fatigue generally low • Breathing is more regular than at level 1
3	Tempo	5-6	70-80	84-94	76-90	• More frequent/greater sensation of leg effort/fatigue than at level 2 • Requires concentration to maintain, especially at upper end of range • Breathing deeper and more rhythmic than level 2, such that any conversation must be somewhat halting but not as difficult as at level 4
4	Lactate Threshold	7-8	80-90	95-105	91-105	• Just below to just above Lactate Threshold • Continuous sensation of moderate or even greater leg effort/fatigue • Continuous conversation difficult at best • Effort sufficiently high that sustained exercise at this level is mentally very taxing • Consecutive days of training at level 4 possible, but such workouts generally only performed when sufficiently rested/recovered
5a	VO2 Max	8-9	90-95	106	106-120	• Typical intensity of longer (3-8 min) intervals intended to increase VO2 max • Strong to severe sensations of leg effort/fatigue, such that completion of more than 30-40 min total training time is difficult at best • Should generally be attempted only when adequately recovered from prior training – consecutive days of level 5 work not necessarily desirable even if possible • At this level, the average heart rate may not be relevant due to slowness of heart rate response and/or ceiling imposed by maximum heart rate
5b	Anaerobic Capacity	10	95-100	N/A	121-150	• Short (30 sec to 3 min), high-intensity intervals designed to increase anaerobic capacity • Heart rate not useful as guide to intensity due to non-steady-state nature of effort • Severe sensation of leg effort/fatigue and conversation impossible
5c	Neuro Muscular	Max	100	N/A	>150	• Very short, very high-intensity efforts (e.g., short sprints) that generally place greater stress on musculoskeletal rather than metabolic systems

HEART RATE

Knowing how hard to work is important. The more riders challenge themselves by increasing the force and velocity on the bike, the higher the power output. More power equates to more energy expended and more calories burned. However, there is a fine line between training too vigorously resulting in premature burnout and training at low intensity and not making any significant physical changes. Monitoring intensity through heart-rate tracking and/or perceived exertion helps ensure the best training levels for the cyclist. Heart-rate monitoring is an important part of training. A heart-rate monitor serves as a guide to make sure participants train in conjunction with their indoor cycling power goals and target heart rate. Although it is beneficial to use a heart-rate monitor, it is not a requirement in the Keiser M3/M3i Indoor Cycling program. Finding one's pulse and counting it manually is an adequate measure of heart rate.

MAXIMUM **90–100%**		**Benefit:** Helps fit athletes develop speed
HARD **80–90%**		**Benefit:** Increases maximum performance capacity for shorter sessions
MODERATE **70–80%**		**Benefit:** Improves aerobic fitness
LIGHT **60–70%**		**Benefit:** Improves basic endurance and fat burning
VERY LIGHT **50–60%**		**Benefit:** Helps with recovery

HEART-RATE TRAINING

Determining maximum heart rate is a measure of the number of times your heart can contract at any given minute, which can be estimated with a formula or calculated through testing.

Once riders know their resting and training heart rates it is easier to determine if they are working too intensely or not hard enough. After a few months of training, riders will have an increased ability to estimate their heart rate and then adjust their level of exertion accordingly.

If a cyclist says a particular drill feels challenging, chances are his or her heart rate will reflect that.

ESTIMATING MAXIMUM HEART RATE (MAX HR)

Whatever a rider's fitness goals may be, it is important for him or her to establish his or her predicted maximum heart rate (Max HR) first. Most riders are familiar with the formula 220 minus age to establish estimated maximum heart rate. However, there are hundreds of different formulas that can be used to determine predicted maximum heart rate. One of the formulas riders may wish to try is the following:

ESTABLISHING PREDICTED MAXIMUM HEART RATE

WOMEN **210 – HALF OF YOUR AGE – 5% OF BODY WEIGHT = BEATS PER MINUTE (BPM)**

MEN **210 – HALF OF YOUR AGE – 5% OF BODY WEIGHT + 4 = BPM**

Once riders have determined their estimated maximum heart rate, they can use percentages of that number to establish their training heart-rate zones while working out. Current fitness level is one of the indicators of heart-rate response during a workout. For example, if riders want to work at an endurance or aerobic training level (steady-state exercise), they would use 65–75% of their maximum heart rate to determine at what intensity level they should train. The percentage of heart rate determines their level of intensity, which becomes an excellent fitness guide. How exercise feels and a rider's actual heart rate correlate very closely.

Current fitness level is one of the indicators of heart-rate response during a workout. The size of the heart can account for about 50% of your maximum heart rate. Smaller hearts beat faster than larger ones. In general, the more fit an individual is, the stronger their heartbeat and the more blood that is pumped with each heartbeat.

DETERMINING MAXIMUM HEART RATE

There are two ways to determine Max HR without using a predicted Max HR formula:

1. After warming up, perform a long hill sprint or series of hill sprints. Give an all-out, extreme effort until your heart rate reading no longer rises and you approach exhaustion. The final number is your maximum heart rate. A heart-rate monitor must be used and supervision by a medical professional is necessary.
2. Another method to determine Max HR is through a Stress Test performed by a physician in a clinical setting. A maximum Stress Test utilizes a walk/run protocol on a treadmill while a medical team measures your vital signs. The test ends when you either cannot continue or there is no further increase in heart rate with increased intensity.

RESTING HEART RATE (RHR)

Resting heart rate is a measure of the heart beating at rest. A low RHR is an excellent measure of fitness and health. There are various ways to determine resting heart rate. One is to calmly wake up one hour before normal waking time and count one's pulse for one minute. The process is repeated three to seven days in a row and the results averaged. If participants regularly record their RHR and notice that the numbers increase by 10%, it could mean they are over-training or overstressed. If this occurs, riders should take a day off and train lightly for a couple of days until RHR returns to normal. However, a RHR that gradually decreases is indicative of an improving cardiovascular fitness level. It signifies that the heart has to beat fewer times within each minute to sustain normal body functions.

RECOVERY HEART RATE

Recovery heart rate is typically determined by recording it two minutes after the cardiovascular component of the workout. Riders can find their recovery heart rate by counting their pulse for 60 seconds. The main difference between recovery heart rate and resting heart rate is that the recovery measure is taken after exercise. Regularly recording recovery heart rates is another method of determining cardiovascular fitness. A heart rate that returns to pre-exercise levels quickly can indicate a higher level of cardiovascular fitness. In terms of a continuous workout, the faster the heart rate drops, the sooner a rider can perform another drill or interval set.

TRAINING ZONES

The Keiser M3/M3i Bike incorporates two training zones:

- Start-up or recovery training zone at 50–70% of estimated maximum heart rate
- Improved fitness or higher caloric expenditure zone at 70–90% of estimated maximum heart rate

When riders understand their training zones, they can increase or decrease their workload accordingly. For example, if a rider's recovery training zone is calculated at 80–100 beats per minute and his or her actual heart rate is 120, the rider needs to decrease intensity. If the rider's improved fitness zone is 140–170 beats per minute and his or her heart rate is at 130 beats per minute, the rider should increase the workload by pedaling faster and/or with more resistance.

The start-up or recovery training formula is 50–70% of estimated maximum heart rate. Use the following formula to determine the start-up or recovery training zone:

(MAX HR) X .50 = LOW-END FIGURE (MAX HR) X .70 = HIGH-END FIGURE

The working zone (higher caloric expenditure zone) formula is at 70-90% of estimated maximum heart rate. Determine the working or high caloric zone by using the following formula:

(MAX HR) X .70 = LOW-END FIGURE (MAX HR) X .90 = HIGH-END FIGURE

The Inactive Individual: When an inactive or sedentary individual starts exercising, recommend that he or she stay in the lower training zone for the first two weeks of training, taking part in two to three workouts per week. This allows for an easy break-in period, which will help prevent excessive seat discomfort and DOMS (delayed onset muscle soreness). The individual may progress to the next level when they feel comfortable or as prescribed by their doctor or certified fitness professional.

The Active Individual: If individuals have been exercising regularly for a minimum of two times a week and lead active lifestyles, it is recommended that they begin Keiser M3/M3i indoor group cycling classes two to three times a week. They can also spend 60–80% of their workout in the higher training zone. A good rule of thumb is to perform a couple of drills at a higher zone, followed by a drill in the lower zone to help recover, especially if the two higher-zone drills were performed at or above anaerobic threshold.

Advantages of Heart-Rate Monitoring:

Motivation – like a coach, it brings objectivity to a training program

Biofeedback – teaches riders to read their body's response to exercise

Analysis – to design a personalized training program

Detects over-training – heart rate that is 10% higher than normal upon waking may be the result of over-training

Disadvantages of Heart-Rate Monitoring:

Inconsistency – at the same heart rate, riders may not be putting out the same effort

Lag time – there is a 15- to 30-second lag time between exertion changes

RATING OF PERCEIVED EXERTION (RPE)

Although heart rate monitoring is one of many ways to measure the physical response to exercise, there are also other ways to gauge intensity. One of the more common methods to evaluate effort is by Rating of Perceived Exertion (RPE). Even though RPE doesn't actually tell the rate of fatigue, it does provide the rate of tiredness as perceived by an individual when he or she is involved in a determined effort. RPE is a subjective measure and many heart-rate monitoring studies have shown that perception of fatigue correlates very highly with an individual's physiological response.

RATING OF PERCEIVED EXERTION

The Borg Scale is a well-known method for determining RPE. The scale is related to indicators of exercise intensity such as heart rate, breathing rate, concentration of lactic acid and workload.

Ideally, RPE should be moderate to sort of hard to hard during the intense training phases of a workout. The best individual to monitor RPE is the rider. Instructors should ask on a regular basis how the riders are feeling and where they would rate themselves on the RPE scale. As a rider becomes more fit, he or she will evaluate their RPE at a lower level for the same intensity of exercise. This is a positive sign that the training has been effective. Some authors have found a relationship between psychological factors and perceived exertion. For example, if an individual is feeling anxious or upset, the perceived fatigue level may be higher than it is, leading to an overestimated RPE; while the opposite may be true for happy and relaxed individuals who tend to underestimate their level.

When using the Borg Scale in Keiser M3/M3i indoor group cycling classes, it is important to review both the scale and the coordinating descriptions. A better understanding of the scale will ensure a more accurate response by riders. Ask riders how hard (or easy) they perceive they are cycling. Challenge them to increase their intensity or, if necessary, slow down if they are working too hard.

1-10 Borg Rating of Perceived Exertion	
0	Rest
1	Really Easy
2	Easy
3	Moderate
4	Sort of Hard
5	Hard
6	
7	Really Hard
8	
9	Really, Really Hard
10	Maximal: Just like my hardest race

WHAT ARE KILOCALORIES?

Calories are the energy currency of the body. A kilocalorie is a unit of energy equal to one food calorie. The M Series computer calculates and displays the rider's expended kilocalories based on the energy expended only while riding the indoor bike.

The kilocalories displayed on the computer will not add in a basal (resting) metabolic usage of energy. Basal metabolic rate is the number of kilocalories needed to fuel essential body functions and keep body organs and tissues in good working order. Energy used while sleeping is a good example of this number.

KCAL FORMULA FOR INDOOR CYCLING

0.0539 KCAL / WATT / MIN
+ 1.23 KCAL / MIN
+ BASAL METABOLIC RATE

= TOTAL KILOCALORIES

The formula calculates kilocalories by plugging in power and time expended during the ride and the amount of energy needed to sit on the bike while pedaling with no resistance at a slow cadence for one minute. This number is commonly used by researchers who study cycling.

The calculations provide the net amount of kilocalories used as a result of riding the bike. To calculate the gross amount of calories, add the kilocalories needed to maintain basal metabolic rate to the total number of kilocalories used at the end of the ride. There are many methods available to calculate kilocalories. Keiser has chosen this formula based on extensive research.

To put it in perspective, the more power produced, the more energy produced; the more energy produced, the more calories burned!

MODIFYING INTENSITY

One important feature of the Keiser M3/M3i indoor cycling program is the ability to modify intensity.

Riders have their own unique fitness goals and they should cycle at a pace that feels most manageable for them. It is not how hard riders cycle, but how much they benefit and the enjoyment they gain from the experience. Encourage riders to avoid comparing their intensity to other participants. Individualize the workout to meet the needs of each rider.

1. CHANGE POSTURE

The first way to increase or reduce intensity is to change posture.

- Moving the body from an upright position to a more aerodynamic body position forces the hamstrings into a lengthened state
- Transitioning from a shorter relaxed state (i.e., basic position), to a more aggressive position where the hamstring muscles are contracted, intensifies the workout
- The standing climb is more difficult because the rider requires flexibility and torso strength in order to hold the position properly
- When standing, the body weight is placed onto the pedals. This weight transfer requires more muscle fibers to activate, thereby making the intensity increase. Have riders experiment with different body positions to determine which postures challenge them.
- When planning a workout, provide posture breaks and periods of active recovery. Research demonstrates that posture breaks do not significantly diminish the intensity of the workout.

2. SLOW DOWN OR SPEED UP

Increasing or decreasing pedal speed will alter intensity.

- Adding more speed to the pedal stroke in a given gear will increase the intensity of cycling drills
- Always make sure riders are in control when they increase RPM. Avoid pedaling faster than 110 RPM.

3. ADD OR DECREASE RESISTANCE

Changing resistance is another way to change intensity, but it is not a constant variable. Decreasing resistance doesn't always mean a decrease in intensity.

- In a standing climb, the use of medium resistance provides a consistent comfort zone while cycling at a manageable cadence. If resistance is decreased when standing, riders will need to increase the pedal stroke to remain in position. This adjustment increases intensity.
- Adding resistance beyond a moderate level when sitting or standing will also increase the workload and increase intensity

4. MAINTAIN MINDFUL FOCUS AND BREATHING DRILLS

Another way to modify intensity is through mindful focus and breathing drills.

- When the mind is focused on an exciting thought (e.g., winning a race) the body is stimulated into an arousal state, which will help to increase intensity slightly.
- Proper breathing used for recovery can help decrease intensity. The goal is to perform a long exhale through the mouth. Recovery breathing helps to calm down the body by delivering more oxygen to the working muscles.

CLASS DESIGN

Designing and delivering a successful indoor cycling class involves several important factors. Individuals who have participated in and experienced excellent indoor cycling classes can attest to several key elements that make an excellent class, including: a motivating instructor, effective class design, great music and a safe ride. Incorporating these and other components can assist an instructor in creating a great overall workout while developing their own unique teaching style.

Steps for organizing an indoor cycling class include:

1. Establish the duration of the workout (e.g., 30, 45, 60 minutes)
2. Establish a class profile, focus or goal for the workout
3. Find music that fits and coordinates with the determined ride profile
4. Choose appropriate drills for each song selection
5. Ensure a mix of strength, power and speed drills
6. Write out the lesson plan (or try using an App)
7. Practice and edit the workout
8. Put the lesson plan into action

COMPONENTS OF THE WORKOUT

Every cycling class should follow a basic class design format that includes warm-up, cardiovascular conditioning, post-cardio cool-down and stretching.

WARM-UP

A proper cycling warm-up is very important and, when done correctly, includes these benefits:

- Gradual stimulation of the cardiovascular system, neuromuscular system and metabolic energy pathways
- Smooth transition from inactivity to vigorous activity by preparing the body for the increasing demands of the upcoming workout
- Gradual increase in body temperature, heart rate, stroke volume, blood flow, cardiac output and breathing rate
- Decreased risk of acute injuries to soft tissues
- Mental wake-up and preparation for the ride ahead

CARDIOVASCULAR CONDITIONING

The majority of the cycling workout follows the warm-up.

- Class length and the goal of the workout will determine the format and drills used
- In developing, improving and building on a rider's cardiovascular conditioning, it is necessary to have a good understanding of the body's energy systems

POST-CARDIO COOL-DOWN

After the conditioning component of the class, the cool-down is the transitional phase of the workout.

- Post-cardio cool-down allows the heart rate to gradually slow down, promoting good circulation and preventing blood from pooling in the lower extremities
- The cool-down also decreases the risk of dizziness and promotes a gradual return to normal body temperature
- Additionally, it provides a smooth transition into the stretching segment at the end of the class

STRETCHING

Flexibility training (stretching) is a key component in attaining a healthy, balanced body.

- Flexibility is defined as the range of motion (ROM) available around the joint
- Post-cardio stretches should be taught off the bike and are generally static in nature
- Static stretching is defined as controlled and sustained stretching
- Stretches should be held for 30–60 seconds
- Some of the key muscle groups that should be stretched after a cycling workout include: hamstrings, quadriceps, hip flexors, gluteal muscles/deep hip rotators, gastrocnemius and soleus, adductors, pectorals, lower back (see Appendix page 65)

Segment	Duration	Purpose
Introduction	2 Minutes	Introduce self, explain the format, and welcome new and returning riders
Warm-Up	5–10 Minutes	Prepare the body physically and mentally for the upcoming workout
Cardio	35–45 Minutes	Improve the cardiovascular system with various ride profiles, formats and drills
Cool-Down	3 Minutes	Safely decrease intensity and prepare for the end of the ride
Stretch	5 Minutes	Improve range of motion by stretching off the bike

FORMATS

Developing an interesting indoor cycling workout begins with an understanding of class profiles, training zones and workout formats. In addition, teaching interesting drills makes the workout effective, challenging and fun.

Proper planning for a workout begins with creating a master instructing template detailing the chosen profile, goals of the class, playlist, imagined terrain, drill choice and instructional cues.

The intensity of the workout should be further developed following a bell-curve design. Gradually increase the intensity of the workout from the warm-up, building intensity as the class progresses, then slowly decreasing the intensity towards the end of the workout.

INTERVAL TRAINING

Interval training is just one of the many different types of training and involves alternating periods of "work" with "recovery" during a workout. Interval training varies the intensity of a workout and challenges riders to work outside of their comfort zone. Variable workloads improve cardiovascular fitness and push riders to break through plateaus.

Interval Training:

- Raises post-cardio metabolism longer than steady-state training
- Helps add variety to a program, prevents boredom, improves motivation and decreases risk of injury due to over-training
- Can be performance-based (very high-intensity workloads designed to enhance competitive performance in sports) or fitness-focused (a modest- to high-intensity effort designed to improve general fitness)

For interval training to be truly effective, an adequate amount of recovery between work sets is required. Interval training and recovery rates will vary according to the goals of a cycling workout.

TYPES OF INTERVAL TRAINING

Sprint Interval Training (SIT)
Repeated all-out efforts; e.g., 30 seconds with 4–5 minutes of recovery (3–4 sets)

Tabata-Style Interval Training
20 seconds of high intensity with 10 seconds of rest for 8 sets; 3 minutes of recovery between sets

High-Intensity Interval Training (HIIT)
Maximal sustained effort for 4 minutes with variable recovery (e.g., 6 sets, 4 minutes each, recovery from 1, 2 or 4 minutes)

Moderate-Intensity Steady State (MIR)
Light to moderate exercise; restorative in nature (30 to 60 minutes)

INTENSITY TRAINING VS. ENDURANCE TRAINING

When compared to traditional endurance training, intensity training offers greater benefits, including:

- More calories burned after a workout because of an elevated resting metabolic rate (RMR) that extends for up to 24 hours due to increased EPOC (excessive post-oxygen consumption) as the working muscle cells are restored to pre-exercise levels
- Improved VO2 max (similar training results as endurance training in fewer workouts)
- Improved athletic performance for well-trained athletes
- Improved fat burning, which may lower insulin levels, improve skeletal muscle fat oxidation and improve glucose tolerance leading to better health for recreational exercisers

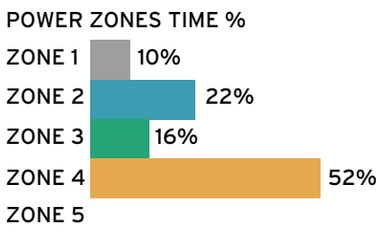
Source: Kravitz, Len. The Physiology Of Weight Loss. (1–4). www.drlenkravitz.com/ Pages/Articles.html

SAMPLE RIDE PROFILES AND TEMPLATES

An instructing template is extremely helpful when designing a workout, especially if an instructor is new to leading indoor cycling classes. The template is the blueprint for the ride and helps the instructor feel better prepared and more confident. Refer to the template throughout the class.

CONTINUUM

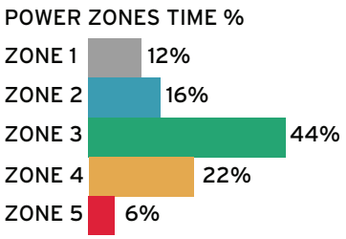
Focus: Steady State Training

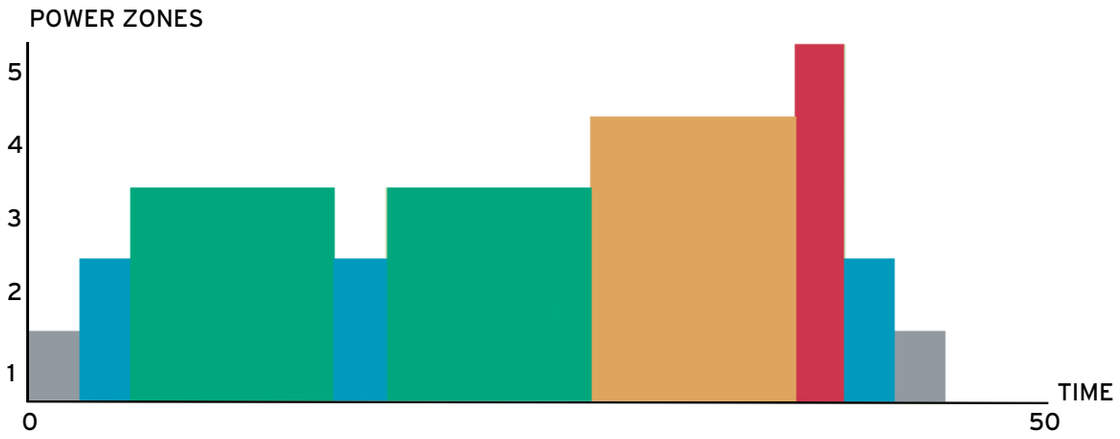


Segment	Segment Time	Elapsed Time	Power Zone	RPM	Body Position	Comments
INTRO	2:00	2:00	ZONE 1	65-75	Seated	Review bike display. Proper cycling technique and grips. Explain workout.
WARM-UP One	5:00	7:00	ZONE 2	75-85	Seated	Increase power and RPMs to change from zone 1 to 2
MAIN One	5:00	12:00	ZONE 2-3	75-85	Standing/Seated 5 x 30"/30"	Activate changing standing and seated cycling
INTERVAL SET One	7:30	19:30	ZONE 3-4	65-75 75-85	Standing/Seated 5 x 30"/1'	Alternate between
INTERVAL SET Two	20:30	40:00	ZONE 4	65-85 85-110	Standing/Seated	Use different POWER drills from the manual
COOL-DOWN One	2:30	42:30	ZONE 2	75-85	Seated	Recover
COOL-DOWN Two	2:30	45:00	ZONE 1	65-75	Seated	Light pedal pressure. Cool down.
STRETCHING	5:00	50:00	-	-	Off The Bike	

PROGRESSIVE

Focus: Intensity Building

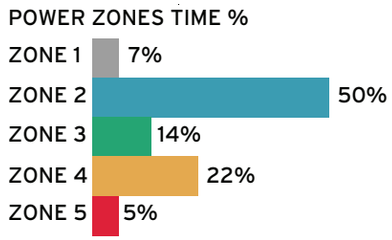


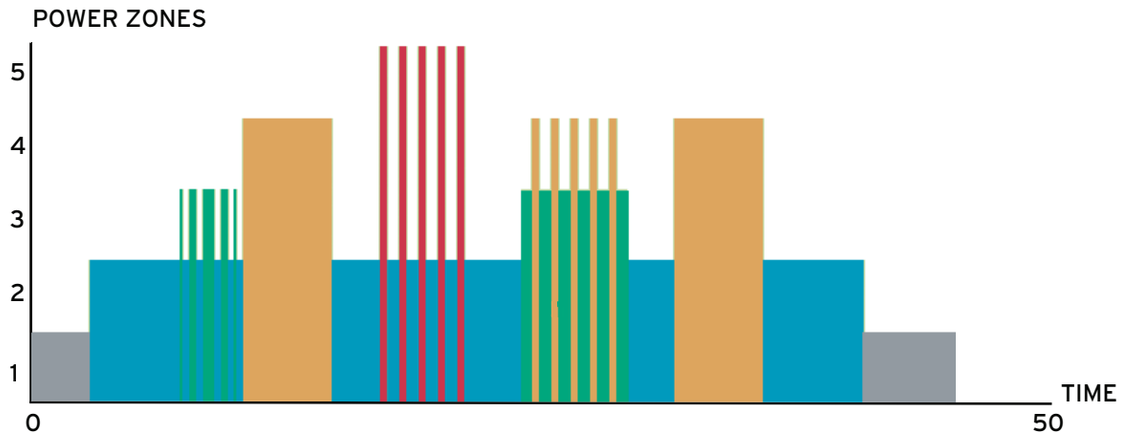


Segment	Segment Time	Elapsed Time	Power Zone	RPM	Body Position	Comments
Intro	2:30	2:30	ZONE 1	65-75	Seated	Review bike display. Proper cycling technique and grips. Explain workout.
WARM-UP One	2:30	5:00	ZONE 2	75-85	Seated	Increase power and RPMs to change from zone 1 to 2
TEMPO SPEED	10:00	15:00	ZONE 3	90-100		Hold a high RPM at tempo power zone 3
TRANSITION One	2:30	17:30	ZONE 2	75-85		Recover
TEMPO TRAINING	10:00	27:30	ZONE 3	70-75	Seated	User should remain in the saddle. Cycling range with enough power to remain just below FTP Zone for the duration of the drill.
LONG HILL CLIMB	10:00	37:30	ZONE 4	65-75 70-75	Standing/Seated	Begin seated spinning, changing to seated climbing, moving to standing climbing. This progression can be reversed if desired. Allow users to try higher resistances for a short time and to challenge themselves to a higher level.
SPEED	2:30	40:00	ZONE 5	85-100		High Intensity Work Zone. This is intended to push the user from a high steady state, just over their threshold and try to hold that intensity for 2'30".
COOL-DOWN One	2:30	42:30	ZONE 2	75-85	Seated	Light pedal pressure. Cool down.
COOL-DOWN Two	2:30	45:00	ZONE 1	70-75	Seated	Decrease power, recover and cool down before relax and stretch
STRETCHING	5:00	50:00	-	-	Off The Bike	

FARTLEK SPEED PLAY

Focus: **Mixed Profile**

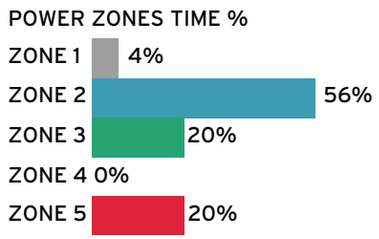


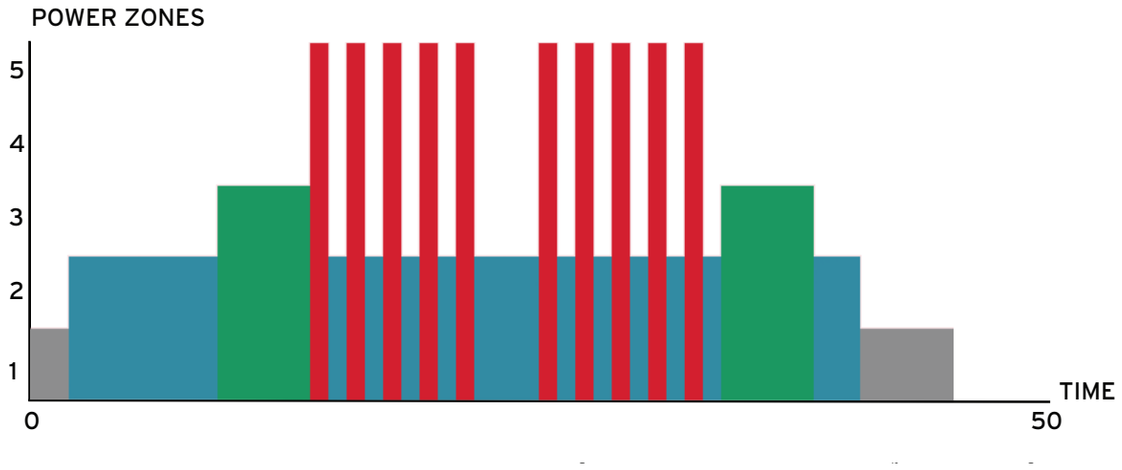


Segment	Segment Time	Elapsed Time	Power Zone	RPM	Body Position	Comments
Intro	3:00	3:00	ZONE 1	65-75	Seated	Review bike display. Proper cycling technique and grips. Explain workout.
WARM-UP One	2:30	5:30	ZONE 2	75-85	Seated	Increase power and RPMs to change from zone 1 to 2
WARM-UP Two	2:30	8:00	ZONE 2	85-95	Standing/Seated 2 x 30/30"	Activate changing body position from 30" standing to 30" seated
MAIN One	3:30	11:30	ZONE 2-3	80-90	Seated 15:15/30:15 45:15/30:15/15:15	Increase RPMs seated to a lift from zone 2 to zone 3
INTERVAL SET One – 1x5'	5:00	16:30	ZONE 4	65-75	Standing/Seated 45"/45"	Challenging work segment
TRANSITION One	2:30	19:00	ZONE 2	80-90	Seated	Recover segment
INTERVAL SET Two – 5x30"/1'	7:30	26:30	ZONE 2-5	75-85 65-75	Standing/Seated 30" Work / 1' Recover	Combines standing at higher RPMs with seating at lower RPMs
TRANSITION Two	3:00	29:30	ZONE 2	80-90	Seated	Recover
INTERVAL SET Three – 5x30"/15"	4:15	33:45	ZONE 3-4	75-85 65-75	Standing/Seated	Interval segment combining zones 3 and 4
TRANSITION Three	2:15	36:00	ZONE 2	80-90	Seated	Recover Segment
INTERVAL SET Four – 1x5'	5:00	41:00	ZONE 4	65-75	Seated	Alternate between 45" standing climb and 45" seated climb for 5 reps
COOL-DOWN	5:00	46:00	ZONE 2	75-85	Seated	Decrease Power, recover and cool down before relax and stretch
STRETCHING	4:00	50:00	–	–	Off The Bike	

INTERVAL SHORT

Focus: Interval Training





Segment	Segment Time	Elapsed Time	Power Zone	RPM	Body Position	Comments
INTRO	2:00	2:00	ZONE 1	65-75	Seated	Review bike display. Proper cycling technique and grips. Explain workout.
WARM-UP One	3:00	5:00	ZONE 2	75-85	Seated	Increase power and RPMs to change from zone 1 to 2
WARM-UP Two	5:00	10:00	ZONE 2	80-90	Standing/Seated 2 x 30"/30"	Activate changing body position from 30" standing to 30" seating
MAIN One	5:00	15:00	ZONE 3	90-100	Seated	Increase RPMs seated to a lift from zone 2 to zone 3
INTERVAL SET One – 5x1'/1'	10:00	25:00	ZONE 2-5	65-75 75-85	Standing/Seated 1' Work / 1' Recover	Challenging work segment
TRANSITION One	2:30	27:30	ZONE 2	80-90	Seated	Recover
INTERVAL SET Two – 5x1'/1'	10:00	37:30	ZONE 2-5	65-75 75-85	Standing/Seated 1' Work / 1' Recover	Challenging work segment
TRANSITION Two	2:30	40:00	ZONE 2	80-90	Seated	Recover
MAIN Two	5:00	45:00	ZONE 3	90-100	Seated	Return to seated position and increase RPMs and gears to reach zone 3
COOL-DOWN	2:30	47:30	ZONE 2	65-75	Seated	
STRETCHING	2:30	50:00	–	–	Off The Bike	

CLASS INSTRUCTION

GETTING STARTED

Before a class starts, a number of factors should be considered in addition to the workout format. As an example, the studio set-up is important and the bikes may be arranged in a number of formats, depending on the space and the goals of the workout. Before starting a class, the instructor should:

- Ensure all bikes are positioned and ready for the ride
- Position the bikes so riders can see the instructor at all times

ARRANGEMENT OF BIKES

The preferred position of the instructor is facing the riders, allowing for better eye contact and connection with all riders.

Group – A group formation is the one most recommended in Keiser M3/M3i indoor cycling classes, giving the instructor a good view of all the riders.

Circle – The circle or half-formation is another option, however, visibility may be limited. Also, if the class is too spread apart it can reduce the feeling of a team environment.

Divided – The group can be divided in rows, but be sure the instructor has an optimal view.

INTRODUCTION AND WELCOME

The purpose of the welcome is to introduce the instructor, explain the components of the workout, check in with new and returning cyclists, and get the riders prepared and excited for the workout ahead.

Use the I.N.T.R.O. acronym:

Introduce yourself and greet the class.

"Hi, my name is Krista. Thank you for joining me this morning."

Name the class format.

"Today's workout is a Power Zone training class."

Talk about the duration, components and goals of the workout.

"The class is 60 minutes long. After warming up, I will lead you through various drills that will focus on using your power readings as an intensity measure."

Reassure newcomers and returning riders.

"Remember this workout is for you, so please work at an intensity that is best for your current fitness level or goals. I will cue various intensity options throughout the workout."

Organize any last-minute equipment or housekeeping needs (e.g., bike placement, refilling water bottles, towels, fans)

"If you need a towel, please let me know as I have brought some extras. Let's get started!"

IMPROVING INSTRUCTING SKILLS

Becoming a great instructor is more than putting together a good workout. Good instructors connect with their riders, both visually and verbally, and are able to motivate and inspire them through effective communication. Communication skills are necessary in any human interaction.

A good instructor must be able to:

- Explain the execution of an unfamiliar or advanced technical skill
- Anticipate the next move and communicate it to the riders
- Provide visualization for different cycling scenarios
- Encourage the group to maintain concentration and work intensity
- Set and instruct different riding rhythms and cycling drills

THREE RULES OF EFFECTIVE COMMUNICATION

1. Communication is a dynamic, two-way process. Not only do we verbalize messages, we receive and interpret them. We know riders have processed information correctly by watching their response to instructions.
2. Communication is received through verbal and non-verbal messages: 70% of communication is visual, so facial expressions convey a majority of our message. It's not only what is said, but how an instructor looks when saying it.
3. Good communication has content, motivation and emotion: content refers to messages, motivation refers to a stimulus and emotion refers to sensations that are felt when receiving the content of the message.

CLOTHING AND FOOTWEAR

Having the proper indoor cycling gear can assist in a more comfortable ride.

- Suggest that riders wear cycling shorts to increase comfort
- If shorts designed for cycling are not available, some riders may choose to experiment with a gel seat cover if they find they are still not comfortable in the saddle. A gel seat cover fits over a bike seat and provides additional padding.
- Although cycling shoes are not mandatory, they can make a difference. Stiff-soled shoes are best for Keiser M3/M3i indoor cycling. A light hiking shoe and even a cross-trainer are preferred to a running shoe. A soft-soled shoe, like a runner, may bend over the pedal when in a standing position.

MUSIC EXPERIENCE

Music has the ability to influence the mind and the emotions of a listener, often producing a physical response, and it is an extremely important component of indoor cycling classes. Music should motivate and inspire a rider and serve as the "road map" for a workout by reflecting or corresponding with a particular terrain or drill. The more comfortable an instructor is with his or her choice of music, the better a class will be overall.

Research has shown that the combination of music and exercise produces positive results by improving respiratory function, the cardiovascular system, the immune system, increasing mental fluidity and even reducing anxiety. In short, when the brain receives a constant stimulation, operating efficiency is much higher. Listening to music while exercising has also been found to create an increased sense of motivation: distracting the mind while increasing heart rate.

Music also plays a very important role related to rhythm or cadence work. The right choice of music will help instructors manage the tempo of the workout and allow each rider to individualize his or her work by varying the resistance and cadence to keep up with the tempo.

MUSIC TERMINOLOGY

- Beats per minute (BPM) is the term used to describe the tempo of music
- To determine the beats per minute, count the downbeats in a song for 15 seconds and multiply by four
- Most songs have a steady beat and riders can pedal to slow, moderate or fast music speeds
- Begin with music tempos around 130 beats per minute, increasing or decreasing the BPM based on the workout format
- It is not a requirement that riders pedal exactly to BPM; beats per minute should be used only as a guide
- There is a close relationship between the cadence (RPM) and the musical beat (BPM)
- The M Series display shows RPM (cadence) in every moment, allowing for changes in cadence and rhythm (increase and decrease) without the need to follow the musical rhythm

CREATING THE PLAYLIST

- Incorporating music in a workout requires extra planning time for the instructor
- Music selection is not as simple as queuing up a series of fast, high-energy songs; consider the emotions and associations that different songs may evoke
- Listen to a variety of songs. Choose enough songs to cover the desired class duration
- Choose from various music genres to appeal to different audiences
- Decide which song goes best with various segments of a ride. For example, a song with a slower, heavier beat may be perfect for an intense climb.
- After determining how the song would best fit into the workout (e.g., fast flats, light climb, moderate decline) choose an imaginary terrain or drill to accompany the song
- There are various music editing programs that can help with the design of the session

PURCHASING MUSIC

- The Internet provides indoor cycling instructors with tools for searching and finding music
- Maintaining industry professionalism means respecting copyright regulations
- There are a number of music companies that make music specifically for indoor cycling or permit instructors to download music legally

USING A MICROPHONE

Teaching with a microphone is an added instructional bonus. Not only will riders be able to hear the instructor's voice over the music, it makes the instructor's job easier. Here are a few tips on correct microphone use:

- Check if the system works before the class begins
- Avoid placing the microphone directly at the mouth – move it away for a less muffled sound
- Never yell into a microphone
- The microphone is meant to amplify a speaking voice. Turn up the microphone volume and lower your voice.
- Check that there is a good balance between music and mic volume; neither one should drown out the other

DRILLS OVERVIEW

The following section provides a number of cycling drills to use in Keiser M3/M3i indoor cycling classes. Modify the drills based on your own creativity and the needs of the riders. Keeping exercise physiology in mind, the drills can be made more or less intense by increasing or decreasing the recovery times.

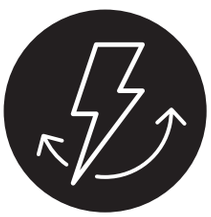
HOW TO INSTRUCT A DRILL

When implementing drills properly in a workout, complete the following instructing steps:

1. **Name the drill**
2. **Explain the focus or the goal of the drill**
3. **Explain the parameters and instructions of the drill**
4. **Implement the drill**

INTERVALS

SPEED WORK



POWER DRILLS

CONTROL

CLIMBING

MUSCLE RECRUITMENT

RECOVERY

METRICS

INTERVALS

Interval training involves changing your intensity throughout a drill or workout – alternating between high-intensity training and low-intensity recovery. Interval training improves both aerobic and anaerobic capacity. Continuous, slow distance training increases aerobic capacity only.

PYRAMID

The pyramid drill is designed to teach riders how to sustain longer, more challenging work intervals with fixed periods of rest. This drill has two unique qualities:

1. The first work interval sets the timing for all of the recovery periods. If you choose 30 seconds as your first work interval, all of the subsequent recovery periods will be 30 seconds.

2. The first work interval also establishes the amount of time you add on or subtract for the other work intervals. Using the above example, your next work interval will be 60 seconds, then 90 seconds, etc. When you're ready to come down the pyramid, you'll subtract 30 seconds from the last interval.

Utilize the heart rate feature to maintain a consistent heart rate at lactate threshold during the work interval and to identify how well the heart rate is returning to aerobic intensity during the recovery.

Utilize the same resistance level for recovery periods or to try to come back to the same power output (Watts) during recovery.

LADDERS

Work intervals and recovery intervals progressively increase in intensity through the energy systems. For example, 30 seconds work and 30 seconds recovery, 45 seconds work and 45 seconds recovery, three minutes work and three minutes recovery.

Utilize consistent recovery gear levels and try to maintain the same RPM throughout the work interval.

SPEEDPLAY

Speedplay is work and recovery intervals without a set system. The instructor decides how hard to work the riders. Speedplay is more creative than a timed interval and is a great change of pace from a prescribed program. Observe the riders and train them accordingly.

Speedplay's lack of order can be challenging mentally for riders. Use a fixed time for the length of the drill.

Encourage your riders to achieve similar power outputs with each work interval.

THE TABATA METHOD

Developed in 1996 by Dr. Izumi Tabata of Japan, Tabata involves high-intensity spurts at 170% of one's VO2 max. The workouts total four minutes and involve 20 seconds of high intensity followed by 10 seconds of rest for eight cycles. Real world sets are not taught at the same intensity as the original protocol. Encourage riders to cycle outside of their comfort zone by attacking out of the saddle and then sitting to ride as hard as they can for 20 seconds. Follow with 10 seconds of recovery with easy pedaling.

Observe power output on each of the 20-second work sets. Try to maintain similar high-power outputs each set.

SPEED WORK

Speed work drills are mostly racing drills. Competitive outdoor cyclists find speed work drills very valuable cross-training tools to enhance their racing performance. Speed work drills can help build speed and power for beginner, intermediate or advanced riders. Progress gradually on a weekly basis to slowly lengthen the work intervals and shorten the rest periods. Instruct your rider to use imagery to visualize breaks, sprints and hill climbs.

TEMPO TRAINING

For this drill, pedal cadence should be low and participants should remain in the saddle. Cycle 70–75 RPM with enough resistance to remain just below anaerobic threshold for the duration of the drill.

Utilize both the RPM and resistance level to identify one's current workout intensity and compare the results in the next class to monitor progression.

Once anaerobic threshold is achieved, observe either the heart rate or power output and maintain this level throughout the drill.

FAST AND FURIOUS

This drill simulates demands needed to finish a fast, flat race. Set baseline cadence at 90–95 RPM. Increase gear until anaerobic threshold is reached. Each minute, increase two to three gears for a set amount of minutes (e.g., three minutes). Finish by "hammering" 10–20 pedal strokes at highest effort possible; then return to baseline gear. Ensure riders decrease cadence before gear when returning to baseline. Repeat four to five times.

End with one to two minutes at all-out/ highest output, simulating crossing the finish line.

10 x 10 x 3

This drill helps riders train at higher cadences while experiencing small increases in gear and improving the ability to ride with power at faster speeds.

Establish cadence at 90 RPM with just enough resistance to have control in pedals. Give riders permission to go slower if they cannot find a balance between cadence and resistance.

Perform three 10 x 10 drills: every 10 seconds add 10 Watts while working to maintain cadence. Use the first set as practice. Adjust 5–15 Watts for each subsequent set.

Re-establish baseline at 80 or 100 RPM and repeat three more 10 x 10s.

BREAKAWAYS

The goal of this drill is to add power to a rider's pedal stroke. To begin, pedal at a slow cadence with light resistance. Cue to increase the resistance, lift out of the saddle and hammer on the pedals. Ask riders to move their bodies over each pedal as they drive downward. After 10 seconds or 10 pedal strokes, sit down and try to maintain the speed set when standing. Slowly decrease the resistance once you notice the speed starting to decrease. Keep the power output elevated until the end of the drill. Remember, in order for real breakaways to be successful, the "attack" must be followed by a higher output work interval.

Utilize the power output to identify peak Watts generated in each breakaway. Try to repeat these levels each time.

Have the riders call out when the breakaways begin but you as the instructor decide when they are over. To realistically simulate an outdoor experience, vary the total time in a breakaway.

SPEED BURSTS

This drill includes short sub-maximal speed accelerations to acquaint the beginner with the use of faster speeds.

Utilize the RPMs to identify speed bursts in a comfortable and appropriate speed zone for the rider. Utilize these zones in other drills.

Observe the power, RPM and resistance ratio to mimic power outputs at different cadences and resistance levels.

THE EDGE

To increase riders' aerobic power, instruct them to pedal at a steady state just below their anaerobic threshold. Cue riders to pedal hills, sprints or against a simulated wind by increasing their resistance and cadence so they are training on the edge of their anaerobic threshold. Ask them to try to maintain their intensity for the entire drill.

Utilize the heart-rate monitor feature to identify a steady state intensity.

Maintain the same power output as you increase the resistance by one gear and decrease the RPM appropriately. After a given period of time, decrease the gear and increase the RPM, maintaining the same power output. Repeat.

SPRINTS

Sprints develop your riders' cycling speed. Sprinting improves the effectiveness of their fast-twitch muscle fibers and improves their ability to use the high-energy ATP stored in muscle tissues. Have your riders perform sprints at close to 100% maximum effort by increasing the resistance first and then increasing speed. Sprints should be 10–15 seconds in duration. Full recovery between sprints is very important to allow for the rebuilding of ATP in the muscles.

Perform sprints in a variety of positions (e.g., seated, standing, aggressive seated) and observe the change in power output on each sprint.

Ensure riders keep within the recommended guidelines by keeping their RPM under 110.

RACE RE-CREATION

Create a race, moment by moment, for your riders. The race begins and ends in the mind. Be as descriptive as possible. For example, let an imaginary gun go off and sprint to the front of the pack. Rest for a few moments, then attack your first hill by adding heavy resistance to the gear lever. Sprint down the other side of the hill with light resistance and push steadily into a headwind with moderate resistance on your gear lever. Assume your sitting aerodynamic riding position and make a break. Shift into a heavy gear and stand in an aerodynamic riding position. Hold that position as you power away from the pack. You are far ahead so you sit upright and take a drink. Cruise comfortably in your sitting position holding your lead. Work together with your teammates creating a circular pace line to the end of the race. When you cross the imaginary finish line raise your arms in victory.

Utilize the RPM, gear lever and power output readings and come back to these same levels as you repeat the course laps.

Simulate the draft by keeping RPM the same but decrease or increase power by changing the gears. For example, on a heavy wind day cue to add 40 Watts and on a light wind day add only 20 Watts.

TIME TRIALING

Time trialing is an all-out effort for a given period of time. Riders should not have anything left at the end of the time trial. Encourage riders to challenge themselves to work outside of their comfort zone for the entire drill.

Try to cover a set distance in the shortest time possible. The work effort should remain the same throughout the entire period. Repeat the drill later on in the class to see if your riders can achieve similar or better results.

Utilize heart rate or power outputs to ensure riders are working at a range that is optimal to achieve an all-out effort without peaking too early.

POWER

Power drills are ideal for improving Watts output and training within correct power zones.

EXPLOSIVE POWER INTERVALS

Explosive Power Intervals are the highest power output that a rider can produce for one minute. The effort should feel extremely hard. Start in the saddle and then increase cadence at a moderate to hard gear to a personal maximum. Next, attack out of the saddle, then sit and ride hard for one minute. The recovery time between sets should be five minutes.

The drill may need to be taught in 15-second starting sets. Work on explosive power.

POWER SURGES

Power Surges are rolling increases and decreases in power with consistent intensity changes over time. For example, increase or decrease Watts by 25%.

Try keeping the gear consistent while changing cadence.

POWER PYRAMIDS

The Power Pyramid drill is based on wattage increases estimated by the rider's body weight. To begin, establish a baseline power level that is easy. Next, increase Watts by 50% of one's body weight in pounds. For example, a 130-pound rider would try to add on 65 Watts to his or her current power output level. Next, increase by 100%, or 130 Watts in this example, up to 200% of body weight. The higher the wattage, the shorter the intervals. Note that these range increases are just examples and not necessarily an ideal fit for all riders.

The pyramid can be ascending or descending.

POWER PLUS

The goal of the Power Plus drill is to practice control in the saddle using gradual increases in cadence and an efficient return to baseline cadence. It is also helpful in teaching micro-gearing.

Establish the baseline of 80–90 RPM with moderately high resistance.

Surge: Perform three sets of surges that are each 30 seconds long. Each surge should increase cadence, and each recovery should be a return to the baseline.

Power Surge: Perform three power surges that are each 30–40 seconds in duration and at 10–15 Watts higher. Return to baseline between sets, noting the highest wattage displayed within the work sets.

Power Surge Plus: Perform three sets of Power Surge Plus that are each 30 seconds long. Each set should be at the highest wattage achieved as established in the previous Power Surge sets.

Each set is intended to take the rider over threshold and back, with each set getting progressively more challenging.

POWER ACCELERATIONS

This drill simulates the acceleration demands through the various power output levels that occur in races. By increasing resistance for each sprint, greater power output is also gained. Complete three sprints in one set followed by full recovery between each sprint. Each sprint in the set should be 15 seconds in length.

First Sprint – Cue riders to begin with light resistance on the gear level. Then ask them to add 5% resistance and lift off of the saddle. Have them return to the saddle and pedal at this harder resistance. Tell them to keep their upper body smooth – their hips shouldn't rock – and cue them to keep their heads up as they drive to the end of their sprint.

Second Sprint – This is the same as the first sprint except instruct your riders to add 5% more resistance.

Third Sprint – Again add final 5% to the resistance.

Ask your participants to increase by three to five gears or 30–50 Watts each time. Recover at the same power output.

Change the length of the recovery and observe the change in power outputs.

CONTROL

Control drills improve your rider's neuromuscular and pedaling efficiency. It is important in control drills to include extra technique cues to ensure that, as the intensity or speed increases, technique is maintained.

SPIN UPS

From seated riding, while maintaining a low to moderate resistance, the rider increases cadence a small percentage at a time. Example: Set a tempo and gradually increase leg speed 10% and hold the new cadence for one minute, then increase 10% and hold the new cadence for one minute. Emphasis is on technique and skill acquisition. You may also decrease RPM as a cool down or recovery.

Utilize the RPM to identify the increase in leg speed. Let your riders watch the time and identify when to increase cadence.

CADENCE TRAINING

This training provides practice increasing one's normal riding cadence. This type of training can be incorporated on flats or downhills. For example, ask your class to ride on a flat, then ride at a faster speed. They will become accustomed to holding a faster speed with a lighter pedal resistance, thus improving their pedaling efficiency.

Encourage your group to maintain their wattage, adjusting gears if the speed changes.

If you see bouncing on the saddle, ask your group to focus more on controlling the pedals or decreasing the speed until they find that control again. Using RPMs, ask your riders to notice at what speed they start to bounce, and see if they can improve that week after week.

DIALING IN

The purpose of Dialing In is to increase your riders' cadence with perfect balance and control.

Cue riders to begin with a light to moderate gear. Ask them to not change gears for the duration of the drill. Next, slowly increase pedal speed to a cadence of 80 RPM. While staying in the saddle, have them increase their pedal speed and tell them to keep their hips smooth, with no rocking. Suggest they concentrate on pulling through the bottom of the pedal stroke and over the top. After two minutes of Dialing In, they should be maintaining about 90 to 100 RPM. Allow them to recover and then try the drill again at a new resistance.

Utilize the RPM to watch the increase as they stay in control.

SURGES

Surges are gradual, controlled increases in cadence while riding at a moderately high constant resistance. After the increase is maintained for a brief period of time (fewer than 30 seconds), rather than recover, the rider returns to a pre-surge pace. This is intended to push the cyclist from a moderate to steady state, just over their threshold, to a high-steady state. Surges may be done seated or standing.

The RPM reading is perfect for allowing riders to identify the surge and pre-surge pace. Ensure they return to the same RPM each time.

ACCELERATIONS

Accelerations are work intervals, using progressive increases in resistance while maintaining a consistent cadence. Accelerations should continue for four minutes. Use a recovery before beginning another set. Position on the saddle can be gradually moved backwards as the resistance increases to allow ease of pedaling and better leverage and to provide power to the pedal stroke. Cue to relax the hips to promote full circular and fluid movement with the foot on the pedal.

Give a fixed increase to the resistance each minute with the gear lever (adding two–five gears). Instruct riders to monitor the consistent RPM and adjust accordingly.

CLIMBING

Climbing drills help riders increase muscular power, strength and endurance at higher levels of intensity. By cueing your riders to apply their pedaling efficiency to these drills, riders will experience increased abilities over time.

LONG HILL CLIMB

The Long Hill Climb uses regular increased resistance overload, beginning in the saddle with seated spinning, changing to seated climbing, then moving to standing climbing. The drill progression can be reversed if desired. This is another variation on slow cadence work, allowing riders to try higher resistances for a short time and to challenge themselves to a higher level. Empower riders to determine for themselves when they need to rise out of the saddle.

Move a fixed amount each time (such as two gears).

Move a fixed amount of Watts each time (e.g., 10 Watts for beginners, 30 Watts for seasoned riders).

STEEP HILL CLIMB

The Steep Hill Climb is performed by standing and climbing for the whole drill at lactate threshold intensity. Encourage riders to either use a considerable amount of resistance and climb slowly or reduce the tension slightly and pedal a little faster. Changing posture is another way to vary the intensity of this drill. Cadence for Steep Hill Climb should be 70 to 85 RPM, but maintaining the resistance is more important than the cadence.

Utilize the heart-rate reading or power output to ensure riders stay at lactate threshold.

Repeat the same hill resistance and speed later on in the workout.

HILL REPEATS

Hill Repeats are repeated intervals that have a 2:1 ratio of work to recovery. Example: Riding uphill for one minute followed by downhill riding for 30 seconds. This drill can be performed either seated the entire interval or interspersed with some standing work. Change the hill intensity: easy up and easy down; challenging up and easy down; easy up and challenging down; challenging up and challenging down.

Instruct the participants to set the hill levels beforehand and come back to these levels when repeated. For example, easy up at gear 10 and 75 RPM with challenging up at gear 16 and 70 RPM.

Observe the power output at the end of each hill and meet or exceed with each successive hill.

HILL SPRINTS

Hill Sprints develop strength and power for uphill accelerations. Since this sprint is performed uphill, pedal speed remains slower than normal. Cue riders to begin pedaling with a light gear. As they hit the bottom of the hill, ask them to increase their resistance, lift out of the saddle and hammer on the pedals as hard as possible. Ask riders to increase the resistance again and stay out of their saddle for the entire hill. Focus on holding this top speed for the entire hill. These sprints should be eight to 12 seconds in length, and full recovery between sprints is very important to allow for rebuilding of ATP in the muscles and to ensure a quality sprint workout.

Have the gear levels set before the sprint to ensure quick transitions and efficient work.

Utilize power output readings to identify peak outputs.

HILL INTERVALS

Hill Intervals simulate the acceleration demands that occur in hilly races. Hill Intervals build power and climbing speed while riding at individual lactate threshold. Cue participants to begin by adding moderate resistance as if beginning a long climb. Every 10 seconds, have riders increase the resistance and effort until they are nearly at their maximum power output during the last few seconds of the hill. Ask your riders to slowly increase the resistance until they reach their

lactate threshold. Maintain this effort until they approach the top of the climb. Next, they attack out of the saddle with a hard but controlled effort, increasing RPM to the top of the hill. Normally, this acceleration is performed during the last 10 seconds of the climb. Allow for full recovery between hill intervals.

Ensure the RPM does not drop as they climb the hill and ask for a certain increase in RPM for the final attack.

CLIMB BURSTS

This drill improves the ability to handle attacks on hills.

Riders choose an intensity level just below their lactate threshold and ride in this zone for 10 minutes. Every two minutes, they stand and attack for 12–15 pedal strokes at the highest intensity they can manage. Then they sit down and try to go back to their original wattage. Depending on the fitness level, play with either shorter drill times and less frequent attacks or longer drill times and more frequent attacks to really push the intensity.

Utilize the wattage to bring the group back to the same intensity for both the steady-state work and the bursts.

Challenge the group by asking them to increase each new burst with an increase in wattage of 5 to 10 Watts.

CLIMBING BURSTS 2

Climbing Bursts 2 improves the ability to pedal faster on hills without losing power.

Settle into a mid-range hill cadence (65–75 RPM) with a somewhat challenging gear. The chosen gear should feel like a hill that the rider is reluctant to speed up on.

Increase speed significantly to higher cadences for short bursts of time (e.g., add 10, 15, 20 RPM for 15–30 seconds) at instructor's cue.

Increased work and time should just start to push participants to "out of breath." Work in and out of the saddle.

HILL ATTACKS

The purpose of this drill is to work on the components of attacking on climbs.

Riders start the drill by attacking out of the saddle, as hard as they can, for 45 seconds. Then they sit and settle into the highest intensity that they can maintain for the rest of the climb. If a four minute total time for this drill is chosen, hold at high intensity seated for three minutes, 15 seconds.

Monitor the RPM reading so that all standing speeds are at least 60 RPM. Combine more than one hill attack in a class. Provide an effective recovery time, then repeat the drill.

The goal is to maintain the same wattage for both the attack and the sustained level seated and to operate at minimum anaerobic threshold (at hard RPE) for the seated portion of the drill.

DARING DOWNHILLS

Daring Downhills train riders to bike down steep hills with control, high gear and extremely high efforts.

Start the drill on a moderate climb for three to four minutes. Nearing the top of the hill, prepare for the downhill. First, cue riders to transition into a low, seated decline hill position. As the climb comes to an end, cue a decrease of one to two gears and immediately increase cadence to 100 RPM. With the increase in speed, add gears for control and intensity. Cue riders to "ride the downhill" versus cruising down.

Go into new, moderate climb for three to four minutes, then repeat Daring Downhill.

Repeat three to five times for the entire stage and make each downhill slightly longer every set (e.g., 45, 60, 75 seconds).

MUSCLE RECRUITMENT

Muscle recruitment drills improve your riders' pedaling efficiency. These drills are ideal as warm-up, cool-down and recovery drills, but they also are great intensity drills.

RIDING THE SQUARE

Focus on only one movement at a time. First, have riders concentrate on pushing forward (kicking over the top of the pedal stroke), pushing down, pulling back (scraping ball of the foot along the floor), then pull up (bringing their thighs towards their chests). Gradually segment these four actions together until riding a rounded-off square and working toward a smooth-pedal circle.

Watch the power output, emphasizing certain sections of the pedal stroke.

STANDING PULL AND SEATED PUSH

While riders are seated, have them focus on pushing down from 1 to 5 o'clock on the pedals. When transitioning to a standing climb, change the focus to the upstroke.

Keep a consistent resistance when standing but increase RPM when seated.

Increase resistance by one gear each standing climb.

HAMMERING

The goal of Hammering is to increase muscular power in the saddle. Cue riders to begin pedaling at a moderate resistance while seated. Then, ask the riders to stay seated and begin hammering on the pedals as hard as possible. Tell riders to concentrate on pulling through the bottom of the pedal stroke, smoothly stomping down during the down stroke. Keep the upper body as still as possible and let the legs drive the pedals. The "stomping on the pedals" should last 15-20 seconds, with a full recovery between efforts. This muscular workout will bring your riders into an anaerobic intensity.

Utilize the power reading and try to repeat the first or the strongest effort.

Observe the RPM reading and allow riders to end their effort when cadence starts to decrease.

POWER LEG

The goal of the Power Leg drill is to develop better pedaling mechanics. Riders can expect increased power over top dead-center and through bottom dead-center of the pedal stroke. This drill is best performed by not allowing the non-working leg to relax against the pedal. The length of each interval is the amount of time spent pedaling per leg. Performed with moderate resistance, cue your riders to visualize scraping mud off of their shoes at the bottom of the pedal stroke. Over the top of the pedal stroke, ask them to push their pedal forward just before they reach top dead-center. Complete this drill with both legs completing full pedal circles.

Utilize the power output reading to ensure that one leg is not working harder than the other.

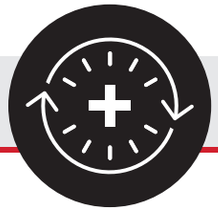
Every time you return to the same leg, increase the gear by one.

ISOLATION TRAINING

Similar to Power Leg training, the rider works on using the down stroke of one leg, while simultaneously focusing on pulling the opposite leg up. After a period of repetitions, change legs. This drill is more of a mental drill than a physical drill to begin with but, with time, it will increase the ability of the legs to incorporate a more efficient pedal stroke. Finish this drill with both legs completing full pedal circles.

Repeat this drill at various RPM and gears.

Observe how power output increases as efficiency improves.



RECOVERY

A Recovery drill focuses on properly recovering after vigorous work has been performed. The instructor may use relaxation techniques, incorporate breathing drills or allow riders to catch their breath. The objective is to warm down the body by decreasing the speed and resistance of each drill. Direct riders to focus inward to slow down breathing and heart rate. Correct recovery time is important after drills and throughout the ride.

APPENDIX A – STRETCHING

Stretching is an important component of a well-rounded fitness program. Flexibility is defined as the range of motion (ROM) available around the joint. Movement around a healthy joint should be confined to the joint's functional range of motion. To prevent overstretching, there are two main sensory organs that assist in monitoring stretch length, speed and tension. Sensory organs transfer information from the Central Nervous System (CNS) to determine where an individual's body is in space, known as kinesthetic awareness. The main sensory organs involved in stretching are the muscle spindles and the Golgi tendon organs.

MUSCLE SPINDLES

The muscle spindles are the skeletal muscle sensory receptors and are located in the muscle cells (fibers) that detect changes in the length of the muscle and speed of lengthening.

- Muscle spindles reflexively stimulate a muscle to contract to prevent overstretching and muscle fiber damage.
- This function is a defense mechanism known as the stretch or myotatic reflex.

GOLGI TENDON ORGANS

The Golgi tendon organs (GTOs) are located in the muscle tendon/musculo-tendinous joint.

The GTOs:

- Monitor strain on the tendon
- Monitor force production and tension in the muscle
- Respond when excessive force is created

The inverse stretch reflex (also called autogenic inhibition) is the firing of the Golgi tendon organs to inhibit or relax a muscle. This is the point to stop further stretching.

CONTRACTING OR STRETCHING?

It is important to identify whether a participant is stretching or isometrically contracting the muscle. If the body is not supported, it will contract the muscle to ensure that the participant does not fall or go beyond its ROM. If the feeling of stretch builds or does not fade away over 30 to 60 seconds, the participant is most likely contracting the muscle instead of stretching. This type of stretching will create tension in the muscle and limit the increase in flexibility. It can lead to small tears in the muscle fibers, which can result in injury or soreness the next day called delayed onset muscle soreness (DOMS). This occurs primarily when gravity is used to assist the stretch. For example, standing on the bike pedals and letting the heel drop is not an effective stretch for the calf muscles.

TYPES OF STRETCHING

Static Stretching – Controlled and sustained stretching; a safe stretch to use off the bike.

Ballistic Stretching – Rapid or dynamic short-duration stretches that use momentum. Ballistic stretching is not recommended as a stretch of choice as it can take the muscle beyond ROM and produce tears in the muscle fibers.

Dynamic Stretching – Controlled movement in and out of the stretch allowing the muscle to gradually warm up into the full range of motion.

PNF Stretching – Works by stretching the targeted muscle, then generating a strong isometric contraction in the muscle being stretched (such as resisting against your hand), then relaxing into a static stretch. This overrides the muscle stretch reflex to take the stretch a little deeper.

FUNCTIONAL FLEXIBILITY TRAINING

Active Stretching – Voluntary or unassisted stretching, using the strength and muscular contraction of the antagonist muscle. For example, while standing, bring the knee to the chest without using the hands.

Passive Stretching – Using an outside force or gravity to increase the stretch. For example, while standing, bring the knee to the chest by holding onto the leg.

MUSCLES TO TARGET POST-RIDE

Some of the key muscle groups that should be stretched after a cycling workout include:

- Hamstrings
- Quadriceps
- Hip Flexors
- Gluteal Muscles
- Deep Hip Rotators (Piriformis)
- Gastrocnemius and Soleus
- Abductors
- Adductors
- Pectorals
- Lower Back

STRETCHING QUICK TIPS

When planning stretch routines, it is important to remember the riding positions used during the class and aim to open the body through stretches in the opposite direction. This will complement the riding positions and make sure participants leave the class feeling open, balanced and relaxed. Multi-joint closed and open chain stretches will ensure the fascia lines and muscle links will be lengthened and released. Include a variety of stretches to ensure a balanced and functional ROM.

STRETCH PAD (M3i)

To facilitate pre- and post-ride stretching of the rider's lower legs, an angled stretch pad is built into the rear frame base of the M3i bike.

TO CORRECTLY TEACH A STRETCH

1. When instructing a stretch, communicate to participants where the intended stretch may be felt.
2. Think of the body as one unit and try to incorporate all aspects of the body into each stretch. For example, neck and arm position in a hip stretch help to open the whole body, taking the stretch deeper, allowing a more time-efficient stretch segment.
3. If good form and technique is lost during a stretch, slightly come out of the position and realign the body.
4. Stretch when the body is warm. Hold static stretches for a minimum of 15 to 30 seconds or until a release is felt.
5. Never hold your breath while stretching – use your breath to release the muscle tension and improve the relaxation response.
6. Breathe from the diaphragm throughout the entire stretching routine.

POST-WORKOUT STRETCHES

1. Soleus and Latissimus Dorsi

- **Stretch:** Static
- **Muscles:** Soleus and Latissimus Dorsi

Application:

- To stretch the muscle underneath the calf, move into a lunge position. With the heel on the floor, slightly bend the back leg until a stretch is felt in the lower leg. Stop when tension is felt.
- Next, clasp the hands in front of the body and turn the palms away. Raise the arms overhead and reach the palms to the sky so that a stretch is felt under the shoulder blades and down the side of the body. Relax and release the arms and repeat on the other side.

2. Hamstrings

- **Stretch:** Static
- **Muscles:** Hamstrings, Latissimus Dorsi, Scalenes and Sternocleidomastoid

Application:

- Stand beside the bike and, with a straight spine, lift the right leg up and place the heel on the floor in front
- Keeping the right leg slightly bent, bend forward at the hip while keeping the spine straight
- Reach the SITS bones back while the spine stays neutral
- When the maximum range is reached at the hip, lengthen the knee while keeping the spine still
- Feel the hamstring lengthen in the muscle versus in the tendon behind the knee
- Extend into a multi-joint stretch by reaching the right arm over head and turning the head to the left
- Switch legs and repeat

3. Gastrocnemius

- **Stretch:** Static
- **Muscles:** Gastrocnemius, Pectoralis Major and Minor

Application:

- To stretch calf muscles (gastrocnemius), assume the lunge position
- Keep your back heel planted on the floor and straighten the back leg
- Ensure the heel and pelvis stay squared
- Feel the stretch in the back of the lower leg
- Now reach the hands behind the pelvis, palms facing out
- On an inhale bring the elbows together and reach the sternum forward
- Feel the stretch across the front of the sternum, collar bones, chest and shoulders
- Switch legs and repeat

4. Hip Flexors

- **Stretch:** Static and Active
- **Muscles:** Hip Flexors (iliopsoas, rectus femoris)

Application:

- Step forward as if performing a lunge
- Hold the position and tilt the bottom of the pelvis forward (posterior tilt) to feel a stretch in the hip flexor (iliopsoas)
- Straighten the spine and extend the leg behind as far as possible without changing the pelvis or lower back position
- On an inhale, reach the same arm overhead to continue the stretch up through the anterior line of the body and release the arm on the exhale

5. Quadriceps and Pectorals

- **Stretch:** Static and P.N.F.
- **Muscles:** Quadriceps and Pectoralis

Application:

- With one hand on the bike for balance, grasp the right foot on the inside of the foot with the right hand so the palm is facing forwards and the thumb is facing out
- Keeping the tailbone reaching towards the floor and the lumbar spine long, bring the knee behind the hip and open the chest/shoulder and front of thigh. Hold for three to five seconds and then contract the quadriceps by pressing the top of the foot into the hand.
- Release and try to increase ROM in the hip by bringing the knee further behind the hip. Hold until a release is felt.
- Switch legs and repeat

6. Hip Abductors

- **Stretch:** Static
- **Muscles:** Hip Abductors, Obliques, Quadratus Lumborum, Latissimus Dorsi

Application:

- Stand sideways next to the bike
- Place the left hand on the bike and bring the right foot in front of the left
- Reach the right hand over head with the right palm facing up
- Press the right hip out laterally to feel the stretch down the lateral line of the body
- Repeat with the right foot behind the left. Switch sides and repeat.

7. Piriformis

- **Stretch:** Dynamic and Static
- **Muscles:** Piriformis, Gluteus Maximus, Hip External Rotators and into Latissimus Dorsi

Application:

- Stand next to the bike and hold onto the handlebars for balance
- Place the right ankle across the left knee in a "Figure 4" position
- Ensure that the pelvis stays level and the movement comes from the hip as opposed to the lumbar spine
- Bend the standing leg until a lengthening into the right hip is felt
- Move in and out of this position three to five times holding the stretch for three to five seconds and then complete the stretch by statically holding the position for 30 seconds
- Add the opposite arm reach to continue the stretch up through the lower back and latissimus dorsi
- Switch sides and repeat

APPENDIX B – INJURY PREVENTION

Keeping a rider injury-free begins with proper bike set-up and class instruction. Instructors should be vigilant about safe indoor cycling practices.

AVOIDING SADDLE DISCOMFORT

A rider's number one complaint is discomfort in the groin or pelvic area. Here are suggestions for new riders to avoid this problem:

- Ensure they are not cycling faster than their ability to control the pedals and thus bouncing on the saddle. An effective cue may be to imagine they need to keep loose coins quiet inside a cycling shirt back pocket or belt pack. As new riders will not know what their abilities are at different cycling speeds, ensure you cue RPM ranges and emphasize proper riding technique.
- Gradually ease into cycling workouts. For example, suggest beginning with a maximum of 10 minutes of continuous time in the saddle and increase the duration weekly.
- Encourage new riders to include standing climb postures throughout the ride to provide saddle breaks
- Wear padded cycling shorts or use a gel seat cover
- Check the position of the pelvis on the saddle. The SITS bones should make contact with the rear portion of the seat. Riding too far forward will cause the center of the saddle to press against soft tissue.

AVOIDING KNEE PAIN

The joints most affected by the cycling mechanics are the hip, knee and ankle joints. The most frequent joint discomfort in cycling emanates from the knee. Knee pain must be addressed immediately to prevent further injury. All knee-related injuries and treatments should be managed under the care of a physician.

- Chronic knee pain may be caused by incorrect seat height, heavy resistance, poor foot positioning or inappropriate riding style. Adjust as necessary.
- Pain on the outside of the knee during the pedal stroke may be aggravated by friction on the iliotibial (IT) band. The IT band is a long, fibrous tendinous sheath located on the outside of the leg. It extends from the side of the pelvis past the knee. Lowering the seat, working the soft tissue (i.e., self-myofascial release or massage) and stretching the lateral line of the body (from the foot to the hand), may help alleviate IT band syndrome.
- If riders pedal with heavy resistance or neglect to warm up properly, they may find themselves experiencing pain below the kneecap. Instead of hammering heavy resistance, cue riders to pedal faster with less resistance.
- Pain on the inside of the knee may be caused by friction of three muscles rubbing together – the sartorius, gracilis and semitendinosus. Friction can lead to inflammation. Rest, lowering the seat slightly, working the soft tissue and flexibility training for the hip structure may help.
- Quick Fix for Knee Pain: Check alignment – If the pain is in the front of the knee, raise the seat a notch. If the pain is in the back of the knee, try lowering the seat.

AVOIDING PAIN FROM THE NECK DOWN

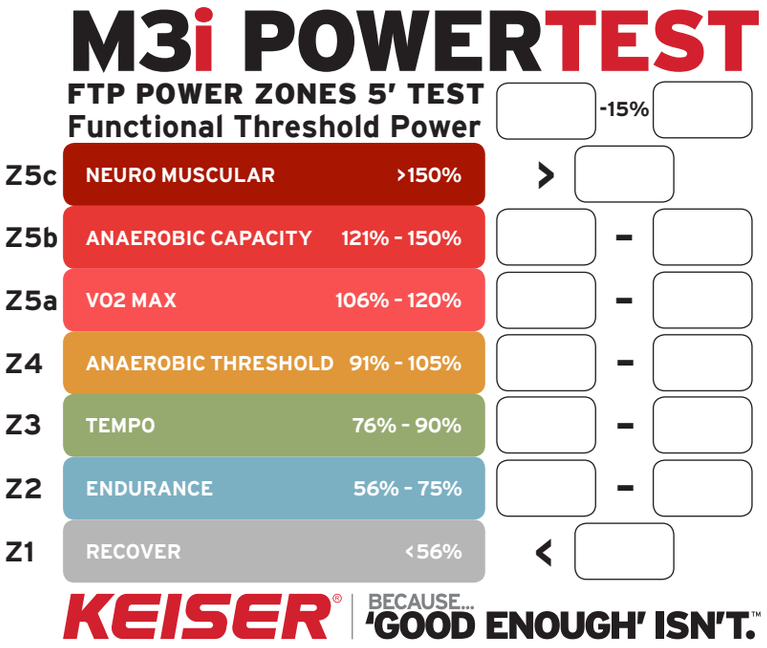
- Neck pain may occur when riders round their thoracic spine and/or turn their shoulders inwards. Cue to slightly retract the shoulder blades, widen the collar bones or open the front of the shoulders. Include posture breaks throughout the class and cue riders to look forward at the "road" in front of them versus looking up at you.
- Lower-back pain can occur when riders flatten their lumbar spine, fail to maintain inner-unit core stability or become tight in their hip muscles. Maintain neutral spine throughout the ride, provide posture breaks and ensure a balanced hip flexibility section of the class.
- Wrist or forearm pain may be caused by not maintaining a proper line between the forearm, wrist and hand. Avoid breaking at the wrist and holding onto the handlebars too tightly.
- Foot pain may be caused by tight shoes, tight cage straps, soft-sole shoes (e.g., running shoes) or excessive pressure from the ball of their foot on the pedal
- Foot cramping can also occur when riders pedal with their feet too far inside the cages or grip with their toes when they ride. Keep the ball of the foot over the pedal and relax the toes.
- Cue riders to pedal in a continuous circle. When cycling speeds drop below 60 RPM, the pedal stroke will momentarily pause or stop. These pauses require riders to overcome inertia with each pedal stroke, which may lead to knee pain.
- As the instructor, make sure you can see each rider clearly at all times. Keep the room well-lit and place each bike in a position where all riders can see you and you can see them at all times.
- If a rider begins to feel faint or dizzy, he or she should gradually stop pedaling, carefully dismount from the bike and ask for help

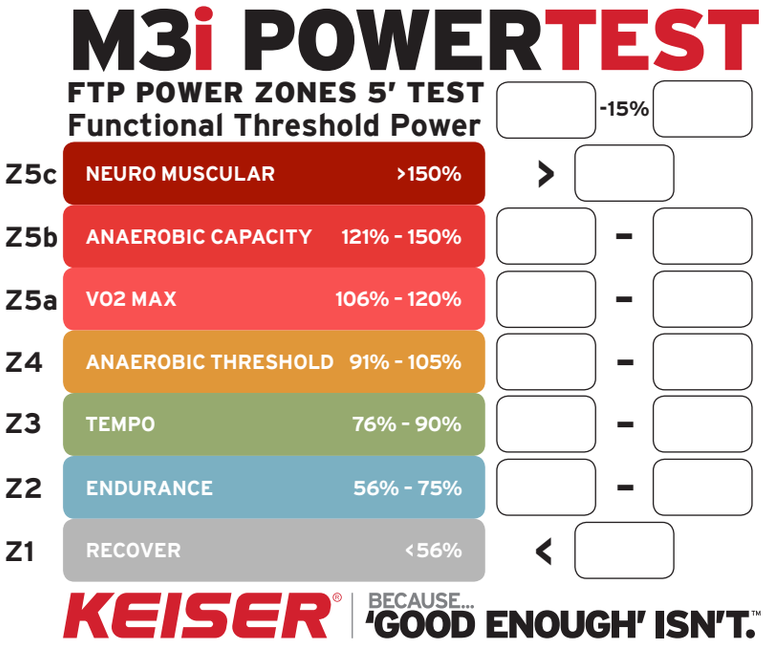
UNSAFE RIDING TECHNIQUES

There are certain movements that should never be taught or performed in a Keiser M3/M3i indoor cycling class. Incorrect positions are potentially dangerous and may cause injury. Here are some postures and movements to avoid:

- Cycling backwards
- Cycling with the saddle removed
- Cycling off the back of the bike (behind the seat)
- Cycling with all your weight over the handlebars
- Stretching on the bike
- Resting the entire body on the front handlebars
- Cycling in the low space between the handlebars and seat
- Cycling with no hands (other than in the warm-up, cool-down and while drinking water)
- Cycling with one foot out of the cage
- Cycling with extremely heavy resistance causing minimal rotation (below 60 RPM)
- Cycling from a low to high position with quick transitions
- Placing the hands in a reverse position on the handlebars

APPENDIX C – M3 POWER TEST





GLOSSARY

FITNESS/PHYSIOLOGY TERMS

Active Recovery – It's important to perform active recovery after a sprint instead of resting immediately. Toxins accumulate in your muscles after exercise, but these waste products are drastically reduced if you perform some type of cool-down activity after your workout. Walking, pedaling or light jogging for 10 to 15 minutes will greatly improve the breakdown of metabolites and reduce unwanted stiffness and soreness.

Aerobic Exercise – Aerobic means "with oxygen." Walking, jogging, stair climbing, swimming and jumping rope are examples of this exercise.

Anaerobic Threshold – Also known as lactate threshold. Anaerobic threshold is achieved when your muscles burn and you start breathing heavily during exercise. This is the point where the increasing energy demands of your exercise cannot be met by the use of oxygen and an oxygen debt begins to accumulate.

Basal Metabolic Rate (BMR) – Amount of calories your body burns when resting. Your BMR caloric burn breaks down as 60% from functioning organs, 25% from muscles, 10% from bones and 5% from fat. BMR is usually expressed in calories per hour per square meter of body surface.

Heart Rate Training – Monitoring your heart rate while you perform anaerobic and aerobic training with the purpose of reaching certain heart rate levels.

Lactic Acid – Lactic acid is one of the byproducts of muscle metabolism. It manifests as the burning sensation felt when you exercise hard.

Maximal Oxygen Consumption (VO2 max) – A very important measure of your potential to become an elite endurance athlete. A high VO2 max means that your body processes and uses oxygen very efficiently. The maximum amount of oxygen that can be taken in and utilized in one minute is the formula for discovering your VO2 max. VO2 max will vary as the oxygen supplied to muscle in use depends on how much you weigh and how much muscle you have. That is why VO2 max is expressed as milliliters of oxygen per kilogram of body weight per minute. It reflects the upper limit of your aerobic metabolism and is limited by the amount of oxygen that can be delivered to your working muscle cells. VO2 max is formulated as a product of your maximal cardiac output and maximal arterial-venous oxygen difference at the capillary-cell interface.

Maximum Heart Rate (Max HR) – Your maximum heart rate is the highest heart rate that you can achieve while exercising.

Oxygen Consumption (VO2) – Oxygen uptake, VO2, is the total amount of oxygen consumed by your cells over a given period of time (usually one minute) to meet your energy needs.

Oxygen Debt – When the oxygen you are consuming during exercise recovery is greater than the amount you would take in at rest.

Periodization – A training program segmented into weeks (micro-cycle), months (meso-cycle) and years (macro-cycle). Each training cycle helps set short-term goals, which will ultimately help reach long-term goals.

Recovery Interval (Rest interval) – Recovery between sets of an exercise, which allows you to exert more energy during the subsequent set.

Second Wind – When breathing rate normalizes and your pace becomes relaxed as opposed to labored.

Steady State – When heart and breathing rate reach a level state.

Stroke Volume – The volume of blood pushed out of your left ventricle with each beat.

Training Zone – Working within target heart rate zones.

Watt – A measure of power.

CYCLING TERMS

Cadence – Revolutions per minute.

Draft – The area behind another pedaling cyclist that breaks the wind for you allowing you to do roughly 30% less work.

Field – A group of cyclists in a race.

Hammer – To ride or run as hard as you can.

Pace Line – Several cyclists drafting one another in a line to minimize energy needs and improve the performance of the group. By holding this position, the front cyclist breaks the wind resistance for the following cyclist(s). This allows the following cyclist(s) to rest as one person expends more energy. When the leader is tired, he drops back to the end of the line and then the next person takes over.

Personal Record (PR) – The best time you ever recorded for a specific race or distance.

Road Rash – Abrasions from falling off of your bicycle.

Roadie – A cyclist who enjoys riding the roads rather than the trails.

Rollers – An indoor training device for cyclists, allowing them to pedal and work on their balance at the same time.

RPM (Cadence) – Revolutions per minute when pedaling a bicycle.

Spinning – Pedaling fast and smooth. Also Johnny G's trademarked indoor group cycling program.

Wind Trainer – An indoor training device for cyclists. Their bikes are mounted onto a stand that holds the rear wheel. When pedaled, the rear wheel turns a fan that creates resistance and allows the cyclist to simulate an outdoor riding experience.

SUGGESTED READINGS

Burt, P. 2014. **Bike Fit: Optimise your bike position for high performance and injury avoidance**

Danielson, T. 2013. **Tom Danielson's Core Advantage: Core Strength for Cycling's Winning Edge**

Demartini, J. 2010. **Inspired Destiny**

Friel, J. 2012. **The Power Meter Handbook: A User's Guide for Cyclists and Triathletes**

Hunter, A. 2010. **Training and Racing with a Power Meter, 2nd Ed.**

Nacey, G. 2016. **The Complete Guide to Power Training for Indoor Cycling: Training your cycling power indoors, to improve your riding outdoors**

Passfield, L. 2015. **Training with Power Meters**

Sovndal, S. 2009. **Cycling Anatomy (Sports Anatomy)**

Starrett, K. 2013. **Becoming a Supple Leopard: The Ultimate Guide to Resolving Pain, Preventing Injury, and Optimizing Athletic Performance**

3D4Medical.com, LLC. 2016. **Essential Anatomy 5**

NOTES

KEISER® POWERED™
EDUCATION | COACHING | TRAINING

keiser.com/education | 800.888.7009
2470 S Cherry Ave | Fresno CA 93706 USA | education@keiser.com

KEISER®

BECAUSE...
'GOOD ENOUGH' ISN'T.™