Star Trac Fitness™

Spinning® Computer

User Manual

Installation, Service and Instructor Education

Table of Contents

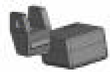
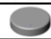
FCC Regulatory Statements

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the follo two conditions: (1) this device may not cause harmful interference, and (2) this devic must accept any interference received, including interference that may cause undes operation.

2. Changes or modifications not expressly approved by Star Trac could void the user's authority to operate the equipment.

Parts List

All 727-0083 Spinning® Computer Kits include:

Part Number for re-order	Quantity	Description	
727-0083 Spinning ® Computer Kit	1	Spinning® Computer	
727-0093-KT Mounting Bracket Kit	1	Mounting Bracket	
	1	V2 Bracket Mounting Insert	
	1	Pro Bracket Mounting Insert	
727-0084-KT	1	Cadence Sensor	
727-0094	1	Cadence Magnet	
N/A	4	AA Panasonic Batteries	
N/A	1	Spinning® Computer Manual	
N/A	1	M5 Allen Assembly Tool	
N/A	1	M2 Allen Assembly Tool	
N/A	1	M6x30 Computer Clamp Screw for Rhino Horn	

e installing the Spinning® Computer, verify that all the parts needed for mounting on your b cluded. If any of the items are missing, call StarTrac at 800-503-1221 or 1-714-669-1660 t a replacement kit.

Marketing Statement Regarding Heart Rate

ting Statement Regarding Heart Rate Acquisition on the Star Trac Spinning® Computer:

rac takes the acquisition and accuracy of heart rate very seriously and has developed a system n to the best ability that technology will allow. Star Trac has engineered a product that has tak precaution possible to acquire an accurate heart rate signal as well as eliminate "crosstalk" rence that may be caused by other monitors being placed too close together.

ieve the best possible results from your Spinning® Computer, please abide by the following ant parameters:

Users **must** wear **Coded Transmitters (such as Polar© T61, Polar© T31C or Polar© WearI** when operating the Spinner® bike with the Spinning® Computer. Only Coded Transmitter wil a "one to one" relationship with the Spinning® Computer and will minimize potential "crosstal interference. If users wear non-coded straps, there is significantly increased potential for "crosstalk" which will cause erratic heart rate display, loss of heart rate display and significan reduce the consistency of accurate heart rate reporting.

Bikes should be spaced so that the side-to-side distance from the Spinning® Computer on or bike and the Spinning® Computer on bikes to the left or right is at least 36 inches (91.4 cm). addition, the distance from the bottom of the Spinning® Computer on one bike to the seat of bike in front of it (where another rider and his/her transmitter would be seated) should be at l 24 inches (61 cm) in order to significantly reduce chances for interference. See the diagram page 21 regarding bike layout.

Riders must lean into the display (within 16 inches) and wait for the HR to display – once the HR is displayed they must maintain the forward Position for 15 seconds while the computer codes with their Polar Coded Strap, this insures that no outside signals will interfere with the riders data once they lean back into their seated position.

Calorie calculations are displayed as a summary only and will ONLY be shown if a user utiliz heart rate strap throughout the entire workout.

Cell phones, televisions, speakers and other electronic devices can cause interference with operation if they are in close proximity to the Spinning® Computer and/or transmitter.

e are any questions regarding operation or usage of the Spinning® Computer, please contact rac Customer Support at 800-503-1221 or 1-714-669-1660.

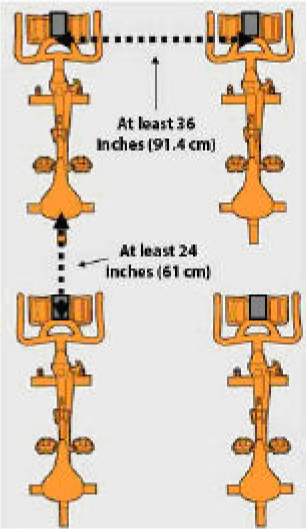
Specifications

:omputer:

Heart Rate Range:	Approximately 30” From computer to users HR chest s
Battery:	Qty 4 each AA Alkaline
Battery life expectancy:	1 year (depending on use and backlight usage)

:adence Sensor:

Battery:	Lithium CR2032
Battery life expectancy:	Approximately 2.5 Years (depending on use)
Distance to magnet:	Approximately 5mm

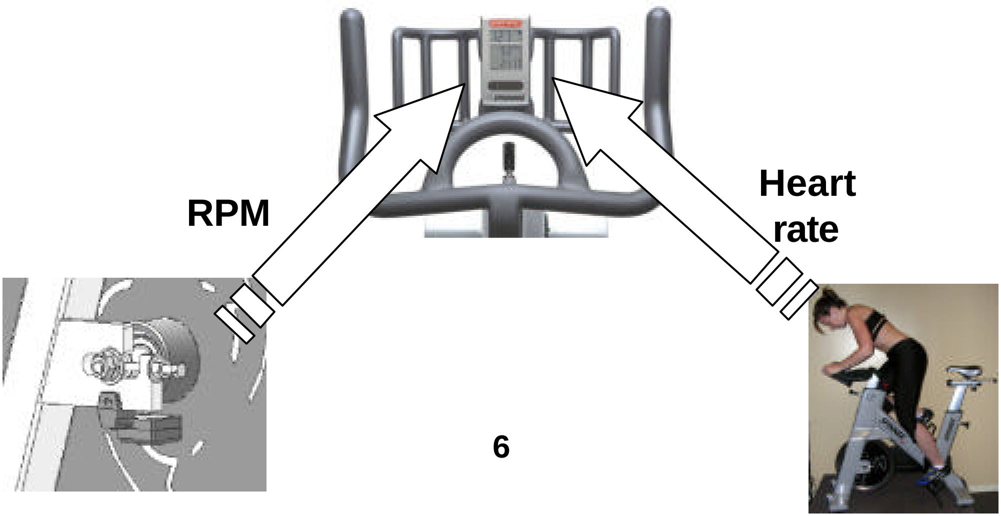


How it Works

How does the Spinning computer work?

pinning computer displays heart rate, RPM (speed), total distance and elapsed time.

- The **heart rate** information is received from a Polar© T61, Polar© T31C or Polar© WearLink® **heart rate strap** worn by the person riding the Spinning Bike. The Polar sends a radio signal to the computer and the **computer** displays the person's heart If any other strap is used it will not display the heart rate. The computer and heart ra strap must be within range of each other and no other heart rate strap can be within imaginary circle. The range is approximately 36 inches from the computer.
- The **RPM** signal is transmitted by the cadence sensor sending the RPM to the **comp** Each time the **magnet** on the flywheel passes the cadence sensor it records one revolution and as it counts the revolutions it sends this number to the computer.



Computer Window and Buttons

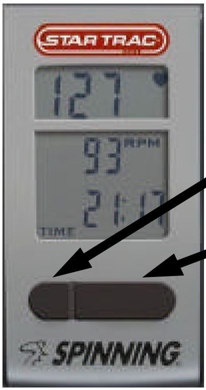
pedaling then press any button to turn on the Spinning® Computer; the following data will b
yed:

HR- Displays the Heart Rate of the user when wearing a compatible Polar® HR telemetry strap in beats per minute.

RPM- Shows the pedaling speed of the user in revolutions per minute.

Total Distance- Distance measured in miles or kilometers depending on the set selection.

Elapsed Time – The length of time in minutes from the time the computer has b activated or reset.



Buttons:

Light (left) button - Turns on the backlight to enable viewing i light settings.

Toggle (right) button - Toggles between: Total Distance and Elapsed Time.

Installing or Replacing Batteries

Low Batt
Indicator

required:
5 Minutes
required:
4 new AA alkaline batteries
required:
Slotted or Phillips screwdriver

The batteries in the computer will last approximately
r depending on usage.
adence sensor battery will last approximately 2.5

Remove the computer from the handlebar or computer mounting bracket.

Loosen the captive screw on the back of the battery cover (screw will not completely come off, it will remain captive.) To remove the cover, pull on the captive screw and lift.

Install 4 new batteries. Note: Replace all 4 batteries at the same time.

Installing or Replacing Batteries – cont'd

Note the directions each battery is to be installed. There is a plus (+) and minus (-) sym inside the battery compartment. The + sign indicates the positive (+) side on the battery the - indicates the negative (-) side on the battery.

Insert each of the 4 batteries into the battery compartment of the computer.

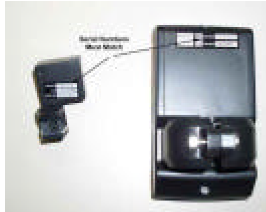
Attach the battery cover and tighten the screw.

Attach the computer onto the handlebar or computer mounting bracket and test.

Do I need to Re-sync?

: Syncing will not improve Heart Rate and is not a calibration it should only be used to Syr
ɹp) the cadence sensor and the computer so that RPM can be transmitted.

m the Syncing process after checking all of the following:



- Do the serial numbers on the cadence sensor and the computer match?
  - o If they do not match the handlebar has been swapped with another bike and should be swapped back, so the computer and sensor are matched up again.

- Is the battery secure in the cadence sensor and the cover is not loose?
  - o A loose battery will prevent the cadence sensor to transmit the RPM signal to th computer.

- Is the magnet aligned with the cadence sensor?
  - o A missing magnet or one that is not lined up properly will prevent the cadence s to transmit the RPM signal to the computer.

- Does the computer turn on when you press a button?
  - o If the computer does not turn on replace the batteries in the computer.

- The computer turns on but as you pedal it does not show the RPM.
  - o If you have performed all of the above steps you may now sync the computer ar cadence sensor. This will make them a paired set and will be able to transmit aı receive the RPM signal.

Testing for RPM

required:
Less then 5 Minutes
required:
N/A
required:
N/A

EST Procedure:
Once the batteries are installed, press **any** button and the display window will turn on in Workout mode.

Test by waving a magnet across the cadence sensor. If you see **RPM** values, then the cadence sensor and computer was synced successfully, there is no need to perform the sync process.

If you do not get any rpm reading and the computer turns off you **WILL** need to perform the Syncing process.

OTE: If the cadence sensor and computer are no longer a pair (i.e. when users swap andlebars with the computer attached.) the Cadence sensor and computer will have to be ync'd again. Do not swap handlebars.

TION: TEST ONE BIKE AT A TIME, the range for the cadence sensor is oximately 30 feet and if you are testing the bike and someone else on the s is pedaling another bike you may be picking up the wrong RPM signal.

:ing Process:

required:

Coin (penny, dime, etc.) or similar item to remove battery cover

to Syncing:

Removing the battery lid on the backside of the Spinning® Computer and insert or replac 4 AA batteries.

Once the batteries are installed, press any button and the display window will go into the ɔrkout mode.

Workout Mode window

Holding the cadence sensor, remove the battery cover from the back of the cadence ser using the coin or similar object and take out the battery.

TION: SYNC ONE BIKE AT A TIME, the range for the cadence sensor is ɔximately 30 feet and if you are testing the bike and someone else on the sa is pedaling another bike you may be picking up the wrong RPM signal.

Place the battery back in the cadence upside down to reset the system. Do not put the li
ıck on yet.

Battery facing upside down ®

¬ right side up Battery facing

5. Activate Sync Mode on the computer by holding down the Light ınd Toggle buttons for several seconds until the window displays Conn“

Sync Mode windo

5. Remove the cadence sensor battery and place it back in correctly (battery face will be ri
ide up).

7. Replace the battery cover on the cadence sensor.
   Note: To put the cadence sensor battery cover on correctly, align the arrows before locking shut.

8. With the computer window still displaying "Conn" hold the magnet about 1/2 inch (1.2 cm) away from the edge of the cadence sensor with the large arrow pointing towards the magnet.

   Wave the magnet back and forth several times until the window on the computer displays a random ID number (e.g. ID 45896).

Finally, accept ID by pressing the Toggle (right) button.

). Once the Syncing Process is done, the display should be in the Workout Mode.

Wait for 60 seconds.

You must wait for 60 seconds to allow the computer to reset the ID prope

'. Test for response by turning the computer on then waving a magnet across the cadence sensor, as you did in the test on page 10. By doing this you are simulating the same m as when the flywheel rotates and the magnet passes by the cadence sensor. If you see displayed, then the cadence sensor and computer were synced successfully. Proceed w the installation and mounting to the bike.

)TE: Remember to keep the computer and cadence sensor as a set at all times.

Setup Mode

ꞩpinning® Computer is pre-set with a gear ratio 2 and a setting display distance in miles. It re-set with recommended default settings for the length of time the backlight will stay on w ted and the length of time summary information will be displayed. You can make changes settings by following the steps below. (You will first need to install 4 AA batteries in the uter.) Any time you want to change setting or view information, follow these Setup Mode st

tivate Setup Mode:

1. Press any button to activate computer.

2. Wave a magnet along the right side of the Spinning® Computer until the display window shows all LCD segments flash.

3. Press Toggle (right) button to scroll through available setup options.

4. Press the Light (left) button to change settings on the current display option.

Mode options:

(Default Setting)

- **GEAR** and **Software Version**
  - o Gear Ratio, Select 1 (2.875) for V-Bikes.
  - o Select 2 (3.250) for all other models.
  - o Software Version displayed (-XX)

  Note: User will not get the correct RPM values if the Gear Ratio setting is not correct.

Setup Mode- cont'd

- **Units** - MILES or KM

  Note: User will not get the correct RPM values if the Gear Ratio setting is not correct.

(Default Setting)

- **BLON** – (Default Back Light On*****) The amount of time the backlight will stay on when the left button is pressed. Select between 1 second to 60 seconds using the Light (left) button and press the Toggle (right) button to save and advance to the next setting.

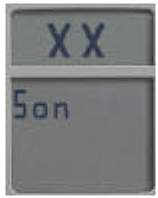
  *Note: Increasing the **BLON** (Back Light On) time will reduce overall battery life. A shorter **BLON** time will result in longer battery life (recommended).

- **BLU** – (Back Light Usage) Total time in minutes that the back light has been on since the last data clearing. Press the Light (left) button to clear data, if desired, then press Toggle (right) button to accept and advance to the next setting.

Setup Mode- cont'd

- **UH** – (Usage Hours) Total operation time in hours of display since the last data clearing. Press the Light (left) button to clear data, if desired, then press Toggle (right) button to accept and advance to the next setting.

- **ODO** – Total Miles / KM
  Total traveled distance in miles or KM since the last data clearing. Press the Light (left) button to clear data, if desired then press the Toggle (right) button to accept and advance to the next setting.



- **SON** – (Summary ON Time) Number of seconds the summary will be displayed at the end of the workout.
  - Options: 30, 60, 90, or 120 seconds
    Select by using the Light (left) button and press the Toggle (right) button to accept and exit Setup Mode.

5. To exit Setup Mode, press the Toggle (right) button several times until the computer returns to Workout Mode.

6. Once out of Setup Mode and in the Workout Mode, one could start monitoring the workout.

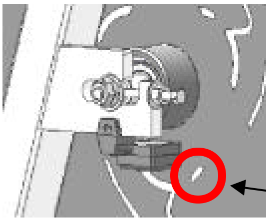
Installation of Cadence Sensor and Magnet – All Spinners®

Before the cadence sensor is securely fastened to the flywheel support, it must be adjus so that it is about 5 mm (.20 in) from the magnet face. Install the magnet on the flywhee that it aligns with the arrow on the end of the cadence sensor. Note the distance betwee end of the cadence sensor and the magnet face. Remove the cadence bracket and adj the distance by pulling or pushing the cadence sensor bracket.

Tighten the set screw on the cadence mounting bracket using the M2 Allen tool

Caution

Do not over tighten the set screw.



Magnet location

Remove the backing of the adhesive on the magnet. Mount the magnet with the adhesi tape side onto the flywheel by positioning the magnet so it will line up in front of the cade sensor as the flywheel turns. Note: Mount the magnet near one of the dots of the Spinn logo as shown in the figure above.

Mounting Computer On Handlebars - V-Bikes

required:
15 Minutes
required:
727-0083 Spinning® Computer Kit
NOTE: The thick insert is used on the V-Bikes
required:
M5 Allen Wrench
M2 Allen Wrench

Place the thick insert inside the bottom part of the Mounting Bracket Clamp. Position the mounting bracket onto the center-curved portion of the handlebars. Once positioned correctly, tigl the 4 M6x20 screws using the M5 Allen tool.

Install the computer onto the mounting bracket by sliding the computer clamp over the long portion of the bracket. Tighten computer clamp with the M6 screw and nut using the M5 Allen tool.

Note: Use the M6x30 screw for the computer clamp when installing onto the computer mounting bracket.

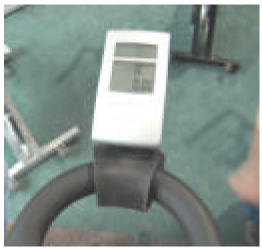
Mounting Computer On Handlebars - Pro 5800 / 6800 / Elite 5900

required:
15 Minutes

required:
727-0083 Spinning® Computer Kit
Note: The thin spacer is used on Pro 5800 / 6800 and Elite 5900 bikes.

required:
M5 Allen Wrench
M2 Allen Wrench

Place the thin insert inside the bottom part of the Mounting Bracket Clamp. Then position the mounting bracket onto the center-curved pc of the handlebars. Once positioned correctly, tighten the 4 M6x20 screws using the M5 tool.



Install the computer onto the mounting bracket by sliding the computer clamp over the long portion of the bracket. Tighten computer clamp with the M6 screw and nut using the M5 Allen tool.

Note: Use the M6x30 screw for the computer clamp when installing onto the computer mounting bracket.

Mounting Computer On Handlebars - Elite 6900 and NXT 7000

required:
15 Minutes
required:
727-0083 Spinning® Computer Kit
Note: The inserts and mounting bracket are not used on the Elite 6900 or NXT 7000.
required:
M5 Allen Wrench
M2 Allen Wrench

1. Install the mounting bracket to the center flat section of the handlebar by slightly prying the computer bracket clamp open.

2. Secure clamp down by tightening the M6x20 screw and M6 nut.

rac strongly recommends performing the regular daily, weekly and monthly preventive enance routines outlined below. If any items need replacement contact the Star Trac Cust rt Department at 800-503-1221 or 1-714-669-1660.

ily W= Weekly M= Monthly

W	M	Procedure
		Daily maintenance of the computer will determine its life of the computer by how consistently it is performed.
		• Wipe down the computer with a soft cloth after each use.
		• Dilute Simple Green (1) with water (30) (30:1 ratio) spray onto a soft cloth then wipe the Spinne Computer. NOTE: Never spray directly onto the Spinner Computer.
		• Never use abrasive cleaning liquids or oil base, ammonia or alcohol when wiping down the com
		The weekly maintenance should focus on the overall performance of the computer. During this por the maintenance look for vibration and possible loose assemblies.
✓		• Inspect each computer for loose parts, bolts and nuts. Adjust as necessary.
✓		• Remove any computers that are not properly mounted and are deemed unsafe.
		The monthly maintenance check should be a comprehensive inspection of the overall assembly components of the computer.
	✓	• Inspect all areas for proper adjustments
	✓	• Inspect all parts to determine damage which will require possible part replacement.
	✓	• Battery Low will display when the battery needs replacement. Replace the batteries in the com with 4 high quality AA Alkaline batteries such as Duracell or Energizer.
	✓	• Inspect the mounting of the cadence sensor and magnet to insure it is intact and working prope

Depending on the amount of use, some procedures may need to be performed more frequ

No display

- Press any button.
- Pedal the bike and then press any button.
- Check batteries in computer.

No heart rate

- Is the user wearing a Polar® "Coded" HR chest strap?
- Moisten the strap and wear it against the skin.
- The battery in the strap might be low, try another strap.
- Stay in Syncing position for 15 seconds. Note: It may take 15 seconds (or more the computer to obtain a heart rate signal from a chest strap.

Heart rate drops out

- Rider may not have held forward position for 15 seconds.
- Rider does not have the recommended "Coded" chest strap or it may not be wo

Which heart rate strap works with my Spinning® Computer?

- Any Polar® "Coded" HR strap. Note: It is suggested to use a Polar® "Coded" se chest strap to reduce HR "crosstalk".

Picking up another riders heart rate

- Bikes might be too close to each other and receiving HR from another rider. Mc the bikes so there is more space from the computer of your bike to the chest of t other rider (see diagram on page 22).
- Each rider should wear a Polar® "Coded" series chest strap.

Battery light does not stay on long enough

- Change the **BLON** time (see page 6).

No RPM

- Is the magnet on the left side of the flywheel and aligned with the cadence sens
- Sync up the computer and cadence unit and wait 60 seconds.
- Check the battery in the cadence sensor.
- If pedaling exceeds 120 RPM, the computer will flash the 120 value until rpm’s decrease.

What is the battery life?

- Computer batteries last approximately 1 year depending on usage and backligh Note: “Low Batt” will be displayed underneath the Heart symbol, suggesting batt replacement.
  - Computer batteries: 4 AA Alkaline
  - Cadence sensor battery: Lithium CR2032
- Cadence sensor battery lasts approximately 2.5 years.

What does the computer display?

- Cadence = RPM
- Heart Rate = BPM
- Total Distance = MILES / KM
- Elapsed Time = MINUTES

otal Calories = kCal

SPINNING®

Instructor Education

ıce, Resistance And Intensity:
ɛstanding the relationship between cadence, resistance and intensity is the key to Spinnin
ım classes that meet training goals. By using the Spinner® computer, you will become mo
ent at increasing power, gaining efficient leg speed and mastering the relationship betwee
esistance and heart rate intensity.

Rate Monitoring:
ɛ discussing cadence and how to use the Spinning® Computer effectively, one needs an
ɛstanding of heart rate monitoring. Heart rate monitors are used in the Spinning® program
uous feedback on exercise intensity. For effective training, it is desirable sometimes to ex
ɛrobic intensity and aerobic intensity at some other times. Heart rates are used to tell whe
ı is in aerobic or anaerobic intensity. Generally speaking, when heart rate is between 65 %
f one's maximum heart rate (MHR) it is aerobic, and is anaerobic when the heart rate is a
An easy way to estimate one's maximum heart rate is to use the age-predicted formula: 2
ubtract one's age from 220 to get age-predicted maximum heart rate. For example, a 30
s 220 – 30 to get age-predicted maximum heart rate of 190 beats per minute (BPM).

y Zones™:

pinning Energy Zones are the foundation of heart rate training in the Spinning® program. E
y Zone™ is a type of training based on exercise intensity (indicated by heart rate).

gy Zone™	Intensity Range	Purpose
ery	50% to 65% of MHR	Relaxation and energy accumulation.
ance	65% to 75% of MHR	Improves muscular endurance and mental stamina
gth	75% to 85% of MHR	Raises metabolism, burns fat, increases energy.
al	65% to 92% of MHR	Trains the heart to recover quickly from work effor
Day	80% to 92% of MHR	To challenge the well conditioned exerciser.

ENERGY ZONE™ HEART RATE CHART

AGE	RECOVERY 50%-65%	ENDURANCE 65%-75%	STRENGTH 75%-85%	INTERVAL 65%-92%	RACE DAY 80%-92%
20-23	100-129	129-149	149-168	129-182	160-182
24-27	98-126	126-146	146-165	126-178	155-178
28-31	96-123	123-143	143-162	123-175	153-175
32-35	94-120	120-140	140-159	120-172	150-172
36-39	92-118	118-137	137-155	118-168	146-168
40-43	90-116	116-134	134-151	116-164	143-164
44-47	88-113	113-131	131-148	113-161	140-162
48-51	86-110	110-128	128-145	110-157	137-157
52-55	84-108	108-125	125-141	108-153	133-153
56-60	82-105	105-122	122-139	105-150	131-150

CADENCE FUNDAMENTALS

Is Cadence?

nce is defined as the number of times the pedals revolve per minute, also known as RPM f
tions per minute. The safest, most efficient and most realistic cadences are 80–110 RPM f
ad and 60–80 RPM for a hill. These ranges are based on studying the cadences of elite cy
ll as understanding how the muscles work together to turn the pedals in the most efficient
er.

nce Range for Flat Roads: 80-110 RPM.

ng faster than 110 RPM is both unrealistic and counterproductive. The resistance knob o
ng® bike is used to increase friction on the flywheel in order to simulate realistic external f
ould encounter on an outdoor bike, such as road surfaces, bike weight and wind resistanc

ing Faster Than 110 RPM Is Unrealistic because:

It's like pedaling very fast in a very low gear—there's a low power to resistance ratio.

It's wasted energy. If a person pedaled like this on street bike, he/she wouldn't generate much power or speed.

A skilled cyclist who has worked on her pedal stroke for many years and has trained the nervous system to react quickly is able to pedal efficiently at 100+ rpm for an extended period. Because of his/her strength and ability to overcome the higher resistance at faste speeds, it is said that he/she has a high power to resistance ratio.

ing Faster Than 110 RPM Is Counterproductive because:

No amount of high-cadence/low-resistance pedaling on a Spinning® bike will succeed a training the nervous system properly. The flywheel is doing most of the work.

One won't achieve his/her performance and weight loss goals.

One won't build leg strength.

ood To Pedal Faster Than 110 RPM?

who have a high power to resistance ratio may occasionally attain these leg speeds. This s they have the ability to overcome resistance through strength and speed. The rare, highl l Spinning® enthusiast (often cyclists) who have mastered a smooth pedal stroke and who stand the dynamics of cadence can pedal faster than 110 rpm for 1-3 minutes. A high mance sprint, used judiciously in ride profiles may require cadences over 110 rpm for 10-2 ds.

cing In The Saddle:

riding at cadences of 100-120 rpm with too little resistance, the rider will bounce in the sa causes the bouncing has to do with the pedal stroke. There are four phases to the pedal s riders, however, usually have only one phase—straight down. That means that they haven ted sweeping the foot back at the bottom of the pedal stroke and pushing the toe forward a s a result, they push down furiously on the pedals and rely on the flywheel to carry their fo the way. When their foot reaches the bottom of the crank arm, the leg can go no further, a is raised up off the saddle, creating that familiar bouncing. The short-term solution is to a resistance, but one must also work on pedal stroke technique and cadence drills.

nce Range For Hills: 60-80 rpm

1998, Lance Armstrong has amazed the cycling world with his ability to pedal at 90 RPM u of Europe's toughest climbs. But keep in mind that Lance can ride at 400 watts for several and stay aerobic (watts is a measure of power; 400 watts is a lot of power), whereas many cyclists may be lucky to achieve 400 watts for a few minutes. In order to pedal at 90 RPM hill, one must either be superhuman or must choose a gear that is so low (granny gear), th ke barely moves. The granny gear is the small cog found on the front chain ring of mountai and some road bikes—it allows the rider to climb hills at a much higher cadence and lower ance, but his/her power and speed are reduced.

t dangerous to exceed 80 RPM on a hill, but for extended periods it will likely raise the ride ity too high and won't achieve the strength benefits of climbing. It is all right to exceed 80 F ef periods, such as in a standing climb for the last 10-20 seconds. The rider intensity will se dramatically, so make sure one has planned for this in his/her profile.

wer limit of 60 RPM on a hill is for safety reasons. There won't be many situations where a will pedal slower than 60 RPM. If one cannot turn the cranks at a faster cadence than 60 sistance is too high. A key indicator is the need to contort the body by throwing his weight i ig the pedal downward while pulling on the handlebars. This excessive resistance places t load on the knee joint and puts the hips and low back at risk. One wouldn't perform a bicep weight that would require the rider to throw his/her hips forward. The same applies to ance while pedaling. A rider must build the strength in his legs using appropriate resistance ce no lower than 60 RPM. If a steep hill is the goal, find the highest amount of resistance c aintain while employing good form at 60 RPM without contorting the body to turn the peda mber, 60 RPM is one revolution of the pedals per second.

For Choosing An Appropriate Cadence And Resistance:

- **Warm-Up.** The first ten minutes of a Spinning ride are critical for establishing proper cadence. With no resistance during warm-up, one may tend to pedal too quickly thu raising the heart rates prematurely. During the warm-up, it's important to work on cadence by keeping intensity under control (65% or less). Use the warm-up to estab smooth cadence and gradually establish a balanced intensity. Similarly, after the wa up, be cautious of increasing cadence over 100 rpm with light resistance (this will als cause a potential anaerobic event and one may spend the remaining class time attempting to recover). In other words, if one chooses to climb after the warm-up, er that intensity and cadence are increasing equally.

- **Resistance.** Resistance is good. Some riders are afraid to add resistance because think they'll end up with bulging quadriceps. But in cycling, it is the sprinters who hav larger quadriceps (high cadences, lower resistance), and the skilled climbers genera have the longer, leaner legs (lower cadences, higher resistance).

- **Intensity.** Slower cadence does not necessarily mean lower intensity. Perhaps a rid feels that if he/she slows down the rpm his/her heart rate will drop too low. But in fac he/she is in control of the intensity because he/she can add resistance as needed. S turns of the knob should eventually generate the required response. Wearing a hear strap is critical to monitor ones intensity goals using the right combination of cadenc resistance.

- **Putting it together.** Cadence and resistance are inversely related. The next sectior explain how cadence and resistance work together to elicit a given intensity. With th understanding, one can coach others to select the appropriate resistance and cader for the terrain they have selected.

:elationship Between Cadence And Resistance:
ıce, resistance and intensity are interrelated. For any given intensity, there is a correlated ce and resistance combination. In other words, if one knows the intensity (heart rate) he/sl to exercise at, and selects the cadence at which to ride, he/she can find the right resistanc that intensity. Or if given a target intensity and target cadence, one can dial in the right am stance.

ɜr words, for every selected cadence parameter combined with a heart rate range, one sho e to find a resistance that will attain that heart rate. The goal is to find that resistance throu mentation. Remember that on some days the resistance may be slightly different than othe due to factors such as fatigue, stress, overtraining, or medication.

ˈing The Concept:
ıllowing examples will help the rider to understand and learn to apply this relationship betw ce, heart rate and intensity.

1. Ride at a steady state heart rate of 75% maximal heart rate (MHR) on a flat road, at a cadence in the range of 85–95 RPM. Dial in the amount of resistance necessary to reac goal.

2. Now find a moderate to hard seated climb at a cadence of 65-70 RPM and at a high-e aerobic HR of around 80% MHR (a range is sufficient). Dial in the right amount of resista to reach that goal.

3. Now suppose the hill just became a little easier, but one wants to maintain the same H 80%. Because it's still a hill, his/her cadence should not rise above 80 RPM. What does need to do to stay at the same intensity as cadence increases? Answer: reduce the resistance just a little.

4. Find a tough climb without exceeding 85% MHR. Continue adding resistance until one feels the need to rise out of the saddle in a standing climb. (Outdoors, cyclists stand on a climb when the road becomes steeper.) Maintain a cadence of 70–75 RPM. Play with th three variables, finding the right combination to meet the parameters. If cadence picks u fast, one will have to increase the resistance. If heart rate rises too high, one will need to adjust one or both of the other variables (cadence and/or resistance).

exercises will help a rider become the master of the road and in control of his/her intensit d of being told to turn the resistance knob a particular number of rotations, one will be able e appropriate resistance for the cadence and intensity desired.

CADENCE DRILLS

et's look at some specific cadence drills which one can incorporate into his/her rides

nce Drill #1: Teaching The Concept Of Cadence Vs. Resistance

rill introduces the relationship between cadence, resistance and intensity. The goal is to ain the same intensity even though the terrain changes. An outdoor cyclist would accompli changing gears.

on a flat road and ride at an intensity of 80% MHR and a cadence of 85 RPM for 5 minute vill allow you to internalize the feel of the cadence and resistance). Ride at 85, 90 and 95 R minutes each, all the while maintaining the same heart rate. If at any point one cannot ain the intensity, he/she should ride at the last cadence to maintain the desired intensity wh mean to go back down the ladder from 95 to 80 RPM.

add a little hill while maintaining the same intensity. Remain seated and ride a progressive er hill by gradually adding resistance every 3-4 minutes. Try to maintain the same intensity In order to do so, one will have to slow his/her legs down as the hill becomes steeper. Ride , 70, 65 and 60 RPM. If one cannot maintain the intensity he/she should ride at the last ce where he/she could.

or the hard part—transition to a standing climb. Once standing, ride back up the ladder fron RPM, reducing the resistance slightly each time. It will be difficult to maintain the 80% MHF l becomes less steep because heart rate often rises with faster cadences on a hill. Take ca the correct amount of resistance (one that allows the rider to maintain the desired cadenc at the same time staying connected to the crank arms (no jerky pedal strokes). On this dril e the time spent at each level to 1 minute each.

ce Test:

rill introduces a basic and reliable method for determining your maximum cadence and als one determine the highest cadence where one can safely and efficiently pedal without bou saddle. Skilled riders can achieve a higher cadence, which will help train leg speed. With g and focus, one can improve skill and leg speed.

a flat road resistance at an aerobic intensity of 70-75% of MHR. Gradually increase the ce from 80 to 100 RPM about 3 RPM every minute, all on a flat road. One can make subtle ments to his/her resistance if needed. Intensity will undoubtedly increase, but one should h num cadence before reaching an anaerobic intensity. Stay seated deeply into the saddle w ng. Pull the feet back at the bottom and push forward at the top of the pedal stroke.

start to bounce, reduce the cadence a few RPM to determine the exact point one can ride ut bouncing. One will probably need to raise the resistance slightly.

ers:

rs are a progressive increase or decrease in one of the following variables: cadence, resis nsity. This drill is best employed using seated or standing flats and seated or standing clin s do not work well for ladders. One can use a combination of the following drills in any prof

- Constant cadence with increasing resistance in a seated flat or standing flat. The terrain gradually becomes a hill.
- Constant resistance with increasing cadence, in a seated or standing position. Intensity increase very quickly, so this requires close attention to your heart rate monitor. This dri also known as spin-ups or accelerations (see below).
- Measured heart rate increases (5 beats at a time) using a combination of cadence or resistance to elicit the increase in intensity. This is an excellent tool to practice control.

erations (Spin-Ups)

erations (also known as Spin-Ups) are a type of ladder where riders progressively increase ce over a fairly short period of time. This drill requires a long warm-up. Accelerations are d rvals and can be quite intense, but they're an excellent way to train leg speed and improve e firing patterns in the legs. It also trains muscular endurance on hills. Accelerations help t o move beyond the cadence where he/she tends to bounce.

drills are done in intervals with ample recovery in between. The work to rest ratio should l :2 or even 1:3. This guarantees that when one begins the next interval, he/she is rested h to give it his/her all. Insufficient recovery will hamper the ability to perform the work inter

e Flats: Establish a flat road resistance at 80 RPM at an aerobic intensity. The first drill will seconds, progressively raising the cadence to 110 RPM. Every 10-12 seconds, raise cade RPM. As one approaches and surpasses 100 RPM, extra effort should be made to stay s in the saddle without bouncing (if one cannot do this without bouncing, he/she should not d that point—it will defeat the purpose).

try this over 60 seconds, raising the cadence 2 RPM every 4 seconds.

d Climbs: Climb at 60 RPM with enough resistance to bring the intensity to 75%. Gradually
se the cadence to 80 RPM over 60 seconds. If possible, use 85% MHR as a ceiling. One
o try this several times to find a hill that allows him/her to stay within the desired intensity.
ng 80 RPM, hold this cadence for progressively longer periods. (15, 30, 45 and 60 second

ing Climbs: Begin at 60 RPM and gradually increase the cadence to 80 RPM. Intensity will
rise quickly, so limit the intervals to 45–60 seconds.

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ing® Ride Profile:

trength Energy Zone™ ride takes a rider on three hills, each one a little longer, steeper an
ore more difficult. For the first hill, attempt to keep the heart rate at 80% max. Allow heart
 to 85% with the second and third hills.

d Time	Duration	Movement/Cadence	Intensity	Technique
:00	5 min	Seated Flat 80-110 RPM	50-65% MHR	Warm up for 5 minutes and allow heart ra rise up to 65% MHR.
:00	4 min	Seated Climb 80 RPM	80% MHR	Settle in to the back of the saddle as you gradually add resistance and take your ca to 80 RPM.
12:00	3 min	Seated Flat 90-100 RPM	75% MHR	Unload resistance and increase cadence 100 RPM. Find the right resistance to main heart rate effort at 75%.
20:00	8 min	Seated Climb 60-80 RPM Jumps on a Hill 60-80 RPM	80-85% MHR	Add resistance to moderate/heavy and co the two movements in any combination. Example: 3 min seated climb, 1 min jump hill, repeat

23:00	3 min	Seated Flat 90-100 RPM	75% MHR	Unload resistance and increase cadence to 9 RPM. Find the right resistance to maintain a h rate effort at 75%.
35:00	12 min	Seated Climb 60-80 RPM Jumps on a Hill 60-80 RPM Standing Climb 60-80 RPM	80-85 MHR	Add resistance to moderate/heavy and combi three movements in any combination. Examp min seated, 1 min jumps, 2 min standing, 3 m seated, 2 min jumps, 2 min standing.
40:00	5 min	Seated Flat 80-110 RPM	50-65% MHR	Decrease resistance to light and allow HR to down to 50-65%.

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