

Riding the TS1

In This Chapter:

*Getting Started On The TS1
Using the Exercise Arms
Heart Rate Monitoring
Contact Heart Rate
Manual Control*



Chapter 1: Riding Your TS1

- Chapter 2: The Display
- Chapter 3: Pre-Set Programs
- Chapter 4: Heart Rate Control
- Chapter 5: Calorie Goal Workout
- Chapter 6: Fitness Test

- Chapter 7: Other Functions
- Chapter 8: Creating an Exercise Plan
- Chapter 9: Setup Mode
- Chapter 10: Test Mode
- Chapter 11: Care and Maintenance
- Chapter 12: Important Safety Instructions

For Your Safety

For your maximum safety and comfort, make sure you read Chapter 12, Important Safety Instructions.

Setting Your Weight

Set your weight before every workout. This allows the TS1 to calculate METs and to estimate your calorie consumption more accurately.

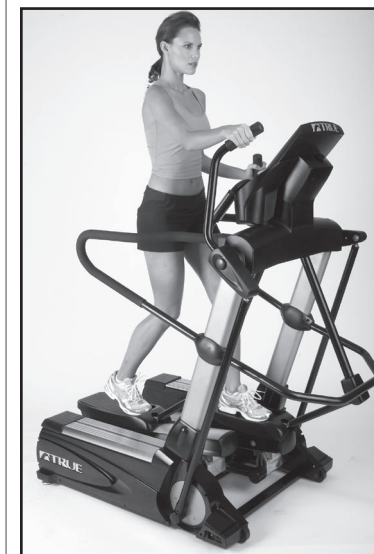
Foot Position

Place your feet anywhere on the foot pads.

Most riders prefer their feet to be as close together as possible, but choose your own position for maximum comfort.

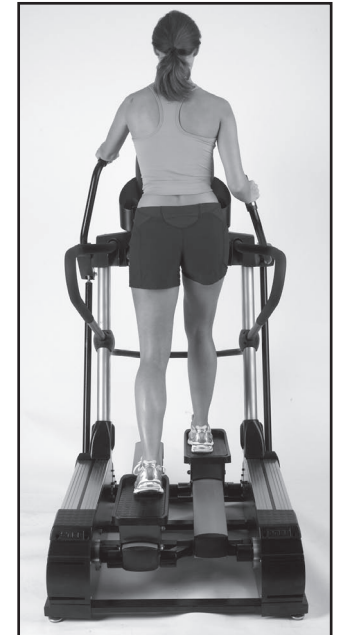
Using the Exercise Arms

You have three hand and arm options when exercising:

***Use the upper-body exercise arms***

The TS1's exercise arms motion will complement your body's natural rhythm, encouraging extra exercise from your upper body and making for an easy exercise balance.

Grasp the exercise arms in a position so that you are well-balanced and your arm motion is comfortable. Grip the handles with a relaxed, not tight, grip.



Using the Exercise Arms

CHAPTER ONE: RIDING THE TS1

RIDING YOUR TS1

You can use the exercise arms for mainly balance, or you can use them for significant upper-body exercise. Any power you apply to them will be accurately recorded by the TS1 console.



Use the balance bar.

Again, grasp the handles with a relaxed grip.

Keep your hands free.

Use caution with this method, as this requires good balance and exercise form.

Many exercisers use all three options during their workout.



Use the Balance Bar or Hands-Free



Heart Rate Monitoring

CHAPTER ONE: RIDING THE TS1

RIDING YOUR TS1

Breathing

Breathe in a regular and relaxed manner. Many exercisers do not breathe enough, which reduces their exercise capacity and comfort. You might want to try breathing deeper and more frequently to see if it helps your exercise.

Monitoring Your Heart Rate

The TS1 can monitor your heart rate using either a chest strap or the metal grips on the hand rails (called contact heart rate, or CHR, pads). A chest strap transmits your heart rate to the TS1 via radio, and the CHR pads connect to a special computer circuit to extract your heart rate.



Although the TS1 functions fine without using the heart rate monitoring feature, this kind of monitoring gives you valuable feedback on your effort level. Chest strap monitoring also allows you to use Heart Rate Control, the most advanced exercise control system available.



Heart Rate Monitoring

CHAPTER ONE: RIDING THE TS1

RIDING YOUR TS1

When you wear a Polar® or compatible transmitter strap, the TS1 will display your heart rate as a digital beats-per-minute (bpm) readout.



The transmitter strap should be worn directly against your skin, about one inch below the pectoral muscles/breast line (see picture). Women should be careful to place the transmitter below their bra line.

Some moisture is necessary between the strap and your skin. Sweat from your exercise works best, but ordinary tap water may be used prior to your workout if desired.

The contact heart rate (CHR) system lets you monitor your heart rate without wearing a strap.

Gently grasp the contact heart rate pads as shown. Most users get good results from the exercise arm pads; however, some users may need to use the balance bar pads for more consistent results.

Chest Strap Heart Rate Monitoring

Contact Heart Rate (CHR)



Contact Heart Rate

CHAPTER ONE: RIDING THE TS1

RIDING YOUR TS1

When the system detects your hands, the Heart Rate label will start flashing in time with your heart beat. During this time, the system is analyzing and locking in your heart rate. Within about 15 seconds, your digital heart rate in beats per minute (bpm) should be displayed.



A Note on CHR Accuracy

Even though the TS1 uses the most advanced digital CHR system available today, CHR monitoring may be a bit less accurate than a chest strap, since the heart rate signals are much stronger at the chest.

About 5% of the population cannot be picked up by any CHR system. This is because their heart is positioned in a more up-and-down manner in their chest, as opposed to leaning over to one side.



Contact Heart Rate

CHAPTER ONE: RIDING THE TS1

1. Exercise with smooth body motions.
2. Breathe smoothly and regularly, and avoid talking. (Talking will cause unrepresentative heart rate spikes of 5 to 10 bpm.)
3. Grip the pads lightly, not tightly.
4. Make sure your hands are clean, free of both dirt and hand lotions.
5. See Appendix A for more details on Contact Heart Rate monitoring.

When using a Heart Rate Control (HRC) workout, it is best to use chest strap monitoring. These workouts work best with the extra accuracy gained from a chest-contact heart rate monitoring system.

For Best Results



Manual Control

CHAPTER ONE: RIDING THE TS1

Normal Mode

There are 25 workload levels that range from 25 watts to 300 watts. (To use workloads higher than 300 watts, see Watts Mode below.) Change levels by pressing the + / - keys.

Normal Mode

Level	Watts
1	25
2	28
3	31
4	34
5	38
6	42
7	47
8	52
9	57
10	63
11	70
12	78
13	87
14	96
15	107
16	118
17	131
18	145
19	161
20	179
21	198
22	220
23	244
24	270
25	300

Watts Mode

Press the Manual key to toggle between manual operation modes. Watts Mode starts at 30 watts and goes to 600 watts, in 10-watt increments. Change levels by pressing the + / - keys.

RIDING YOUR TS1

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The Display

In This Chapter:

Keypad Layout

What the Keys Do

Upper Console

How to Read Your Display



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Chapter 2: The Display

Chapter 3: Pre-Set Programs

Chapter 4: Heart Rate Control

Chapter 5: Calorie Goal Workout

Chapter 6: Fitness Test

Chapter 7: Other Functions

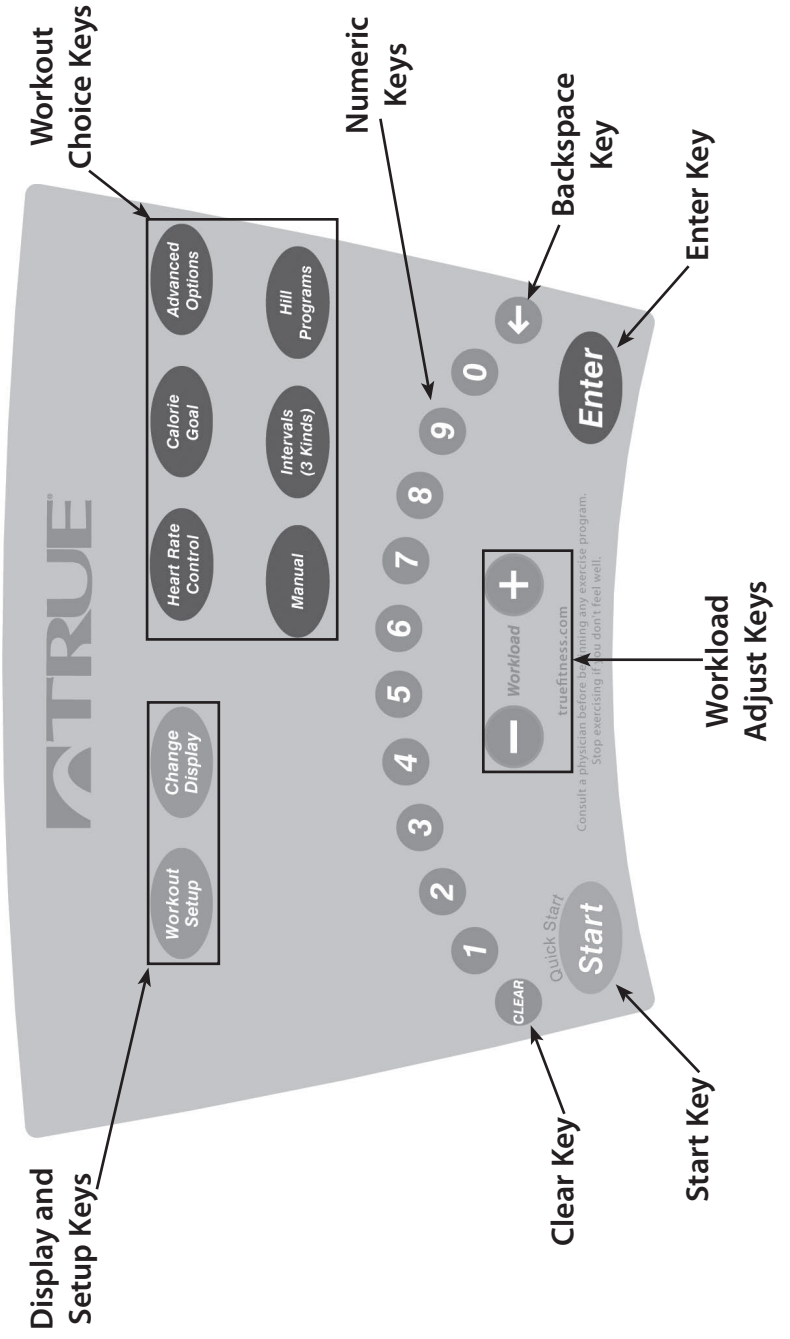
Chapter 8: Creating an Exercise Plan

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The Keys


 **Workout Setup:** Switches into Workout Setup mode.


Workload is reduced and all data accumulation is paused while in Workout Setup.


 **Change Display:** Changes data readouts from one set of four to the other set. Press and hold for two seconds to have the sets automatically alternate back and forth every five seconds.

 ,  **Workload:** Adjusts workload higher and lower. Keys repeat if held down.

 through  **Numeric Keys:** Used for data entry in Workout Setup. During a workout, used to change workload by entering a numeric value and pressing .


 **Backspace:** Deletes your last data keystroke, just like your computer keyboard's backspace key.


 **Clear:** Zeros-out current data entry. Press and hold to completely clear and reset display.

 **Heart Rate Control:** Cycles through Constant and Interval. See Chapter 4.

 **Calorie Goal:** Selects the Calorie Goal workout. See Chapter 5.

 **Intervals:** Cycles through Easy, Sport, and Custom. See Chapter 3.

 **Hill Programs:** Cycles through Rolling and One Big Hill. See Chapter 3.

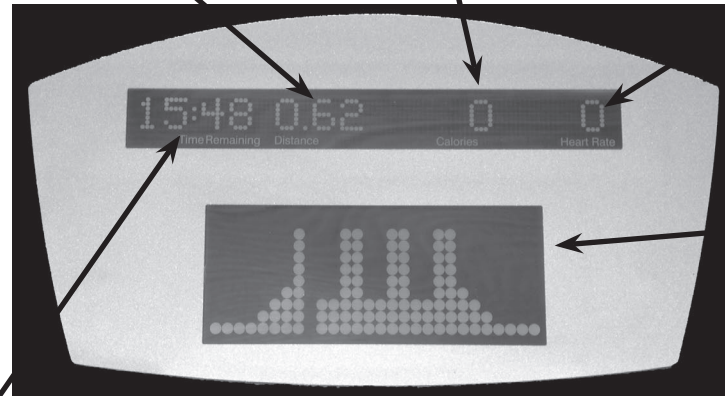
 **Advanced Options:** Cycles through Custom Programs, and Fitness Test. Medical, Ergometer, and Happy modes are accessed through Setup Mode only. See Chapters 6 and 7.

Upper Console

CHAPTER TWO: THE DISPLAY

Distance: An estimate of how far you would have traveled on an outdoor road bike.

Calories: An estimate of your calories burned. This doesn't include your basal metabolic rate, which is about 72 calories per hour for a 150-pound person.

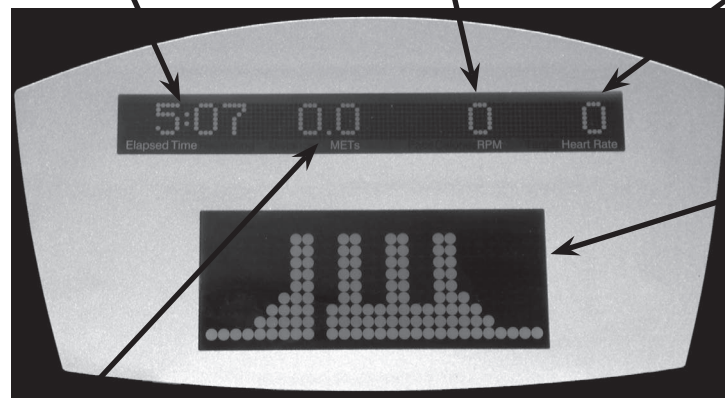


Heart Rate: In beats per minute (bpm).

Progress Display: Shows your progress and workload profile through your workout.

Time: The amount of time remaining in your workout. If you press **CLEAR**, this becomes elapsed time: how long you've been working out so far.

RPM: Your pedal cadence.



Heart Rate: In beats per minute (bpm).

Progress Display: Shows your progress and workload profile through your workout.

METs: Your METs rate.

Pressing the "Change Display" key switches the readout from one set of values to the other set of values. If you press and hold the "Change Display" key for one second, the display will enter "Scan Mode" and switch between the two sets of values.

How to Read Your Display

CHAPTER TWO: THE DISPLAY

How to Read Your Display

Level: Indicates which workout level is selected.

Time: Shows the amount of time remaining in your workout. If you press **CLEAR**, this becomes elapsed time: how long you've been working out so far.

Miles: Shows an estimate of how far you would have traveled during outdoor exercise.

Calories: Displays an estimate of your calories burned. This doesn't include your basal metabolic rate, which is about 72 calories per hour for a 150-pound person.

RPM: Shows your pedal cadence.

Watts: The amount of mechanical power the TS1 is receiving from your exercise. This is not the same as the amount of power your body is using, since the average person is only about 22% efficient at generating mechanical power.

Heart Rate: In beats per minute (bpm).

METs: Your METs rate. See Appendix B.



THE DISPLAY

Pre-Set Programs

In This Chapter:

*Program Choices
Hill Program Profiles
Interval Program Profiles*



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Hill And Interval Programs

Just like manual control, the hill and interval programs compensate for different body weights.

The two hill programs are:

- **Rolling Hills**, a series of gently changing workloads.
- **One Big Hill**, with the workload gradually increasing to a maximum at the halfway point, then decreasing gradually to the end.

Each workout segment can have a value between 1 and 8. The overall workout can be adjusted to 16 possible levels.

The two interval programs are:

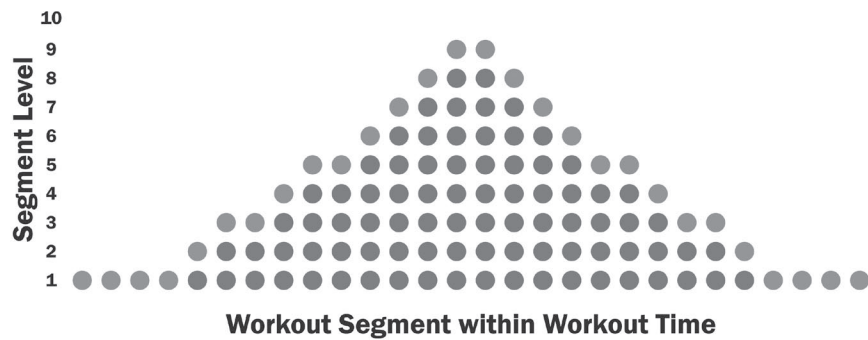
- **Easy intervals**, with a moderate change between work and rest intervals.
 - **Sport intervals**, with a large change between work and rest intervals.
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Hill Program Profiles

CHAPTER THREE: PRE-SET PROGRAMS



Rolling Hills



One Big Hill

Hill Program Profiles



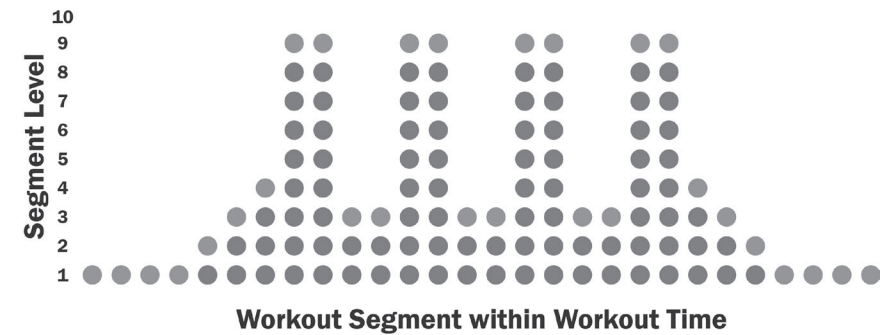
Interval Program Profiles

CHAPTER THREE: PRE-SET PROGRAMS

Interval Program Profiles



Easy Intervals



Sport Intervals

PRE-SET PROGRAMS



Heart Rate Control

In This Chapter:

Introduction to HRC

Types of HRC

Constant and Interval HRC

Important Points About HRC



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Why HRC is So Useful

True's heart rate control (HRC) workouts let the TS1 monitor your relative exercise intensity by way of your heart rate, then automatically adjust the workload to keep you at your target heart rate and thus your desired exercise intensity.

Your heart rate is a good measure of your body's exercise stress level. It reflects differences in your physical condition, how tired you are, the comfort of the workout environment, even your diet and emotional state. Using heart rate to control workload takes the guesswork out of your workout settings.

Consult your physician before using heart rate controlled workouts for advice on selecting a target heart rate range. Also, it is important to use the TS1 for several workouts in the manual mode while monitoring your heart rate. Compare your heart rate with how you feel to ensure your safety and comfort.

See *Appendix A* for a chart that may help you pick a target heart rate.

You should wear a heart rate monitoring chest strap to use heart rate control. See the "Monitoring Your Heart Rate" section in *Chapter 2* for a guide to proper usage. It is not recommended that you use the contact heart rate system for heart rate control workouts.



The TS1 has three types of heart rate control:

- **Constant:** pick a target heart rate, and the TS1 will control your workout from the very beginning so that you reach your target within 5 to 7 minutes.
- **Interval:** pick both a work target and a rest target heart rate. The TS1 will take you back and forth between these two targets.
- **Cruise Control:** while in any program, set your current heart rate as your target by pressing a single key.

Constant HRC is the best-known type of HRC, and is the easiest to use. The TS1 will gradually raise your heart rate so that you reach your target within five to seven minutes. It keeps you there until 2.5 minutes before the end of your workout time, then reduces workload by half for a cooldown.

Note that as you tire during your workout, especially in the last third, workload will usually have to be reduced to keep you at a steady target heart rate.

To change your target heart rate, press the **−**, **+** keys to change one bpm at a time, or enter a new target with the numeric keys and press **Enter**.

Types of HRC

Constant HRC

Interval HRC

This allows you to do a classic interval workout with the TS1 controlling all workloads, including the rest segments. After reaching your work target just like in Constant HRC, the workload is immediately reduced by 65%, then controlled so you reach your rest target within about three minutes.

As soon as you reach your rest target, the workload is immediately increased to the last workload attained in the work segment, then controlled to reach your target within about two minutes.

This pattern repeats until 2.5 minutes before the end of your workout time, then reduces workload to the last rest segment workload.

To change your work or rest targets, press the **+** and **−** keys to change one bpm at a time, or enter a new target with the numeric keys and press **Enter**.

Cruise Control

This is the simplest way to enter Constant HRC training. While in manual or any program you can enter Constant HRC by simply pressing the Heart Rate Control key. Your current heart rate will be set as the target.

For best results, you should be at least five minutes into your workout and warmed up. This will allow Cruise Control to more accurately control your heart rate.

Remember, you must be wearing a chest strap, and your heart rate should be displayed in the Heart Rate window.

To change your target heart rate, press the **−**, **+** keys to change one bpm at a time, or enter a new target with the numeric keys and press **Enter**.

Important Points About HRC

CHAPTER FOUR: HEART RATE CONTROL

The heart rate monitor transmitter strap should be worn according to the guidelines in *Chapter 2*.

If the transmitter strap is adjusted or moved while exercising, heart rate monitoring may be temporarily affected.

The transmitter strap sends a low-level radio signal to the TS1, so interference from other radio and sound waves (including everything from cordless telephones to loudspeakers) is possible. The good news is that interference is usually quite brief. If you continue to have intermittent heart rate display problems, consult your local service technician, as the transmitter strap batteries may be low.

Make sure you breathe smoothly and regularly.

Talking during your workout usually causes heart rate spikes of five beats per minute or more, so avoid talking as much as possible.

Maintain a smooth pedaling motion.

Two users wearing the same kind of transmitter at the same time and in close proximity may cause false heart rate display readings.

Important Points About Heart Rate



Calorie Goal Workout

In This Chapter:

Setting Up a Calorie Goal Workout

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Setting Up a Calorie Goal Workout

Calorie Goal lets you pick a total number of calories and workout time, then calculates a steady-state exercise at a work level (*Cruising Watts*) so that you reach your target total calories at the end of a 2.5-minute cooldown. There is a 2.5-minute warmup prior to Cruising Watts.

Calorie Goal is especially useful if you exercise to help with weight loss or weight control. You might have a specific number of calories you wish to burn in each exercise session. Also, you sometimes have different amounts of time available to exercise. Calorie goal is the easiest way to achieve your exercise goal, no matter what your schedule.

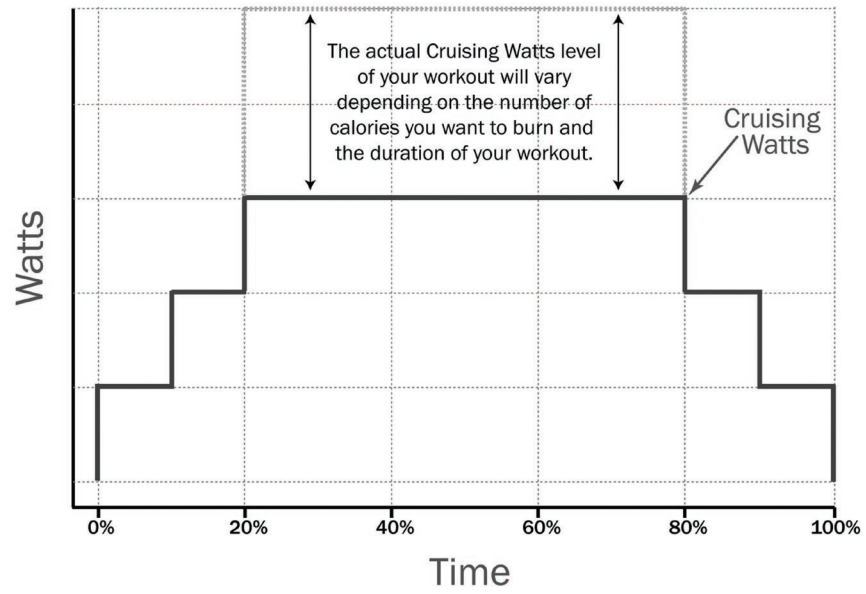
To change your calorie goal, press the **-**, **+** keys to change one calorie at a time, or enter a new calorie goal with the numeric keys and press **Enter**.

Some guidelines: Your workout time must be at least six minutes. If Cruising Watts are 400 or more, a warning will be displayed. The program will not accept a workout setup if Cruising Watts are above 600.

See the graphic on the next page for a visual explanation of a Calorie Goal workout.

Setting Up a Calorie Goal Workout

CHAPTER FIVE: CALORIE GOAL WORKOUT



Calorie Goal Workout Graph

Fitness Test

In This Chapter:

- Introduction and How to Test Yourself*
- Proper Preparation and Behavior*
- How the Test Works*
- How to Use Your Results*
- Test Specific Issues*






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Introduction The TS1 fitness test is an improved implementation of the YMCA protocol fitness test, as described in the *ACSM Guidelines*, Chapter 4. (See *Bibliography*.) The TS1 must monitor your heart rate accurately throughout, so you should use a wireless transmitter strap instead of the contact heart rate pads (see *Chapter 2*).

The result of the test is an estimate of your maximal oxygen uptake, or VO_2 max (see *Appendix B*).

- Press Advanced Options  until Fitness Test appears, then press .
- Fill out all the personal parameters. You must enter your age correctly.
- Press .

How To Do It Make sure the TS1 is displaying your heart rate, then pedal in a smooth and relaxed manner for the 12 minutes of gradually increasing workload. Your VO_2 max estimate will be displayed when you finish.

You should:

- Stay as relaxed as possible during the test, breathing smoothly and regularly.
- Be dressed in comfortable workout clothes and riding in a room with comfortable air temperature and humidity.

You should not:

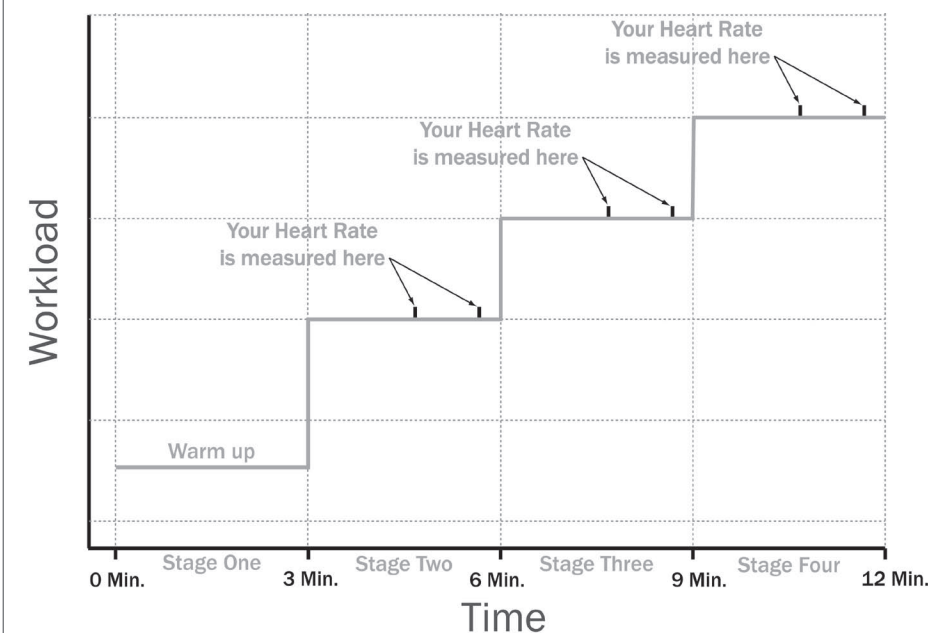
- Eat within three hours prior to testing, but you should not be hungry, either.
- Consume caffeine within three hours prior.
- Smoke within three hours prior.
- Exercise vigorously within 24 hours prior.
- Make any unnecessary movements of arms, head, or torso.
- Talk at all.

Proper Preparation and Behavior

How the Test Works

The test consists of four three-minute stages. Stage one is a warmup stage. Stages two, three, and four are at ever-increasing workloads, with your heart rate measured during the second and third minute of each stage. (If the two heart rate samples in a given stage are separated by more than six bpm, that stage is extended for an additional minute.)

The heart rate measured during the last minute of each stage is compared mathematically with workload, and then extrapolated to your age-predicted maximal heart rate (see *Appendix A*). The workload corresponding to this heart rate is converted to milliliters of oxygen per kilogram of body weight per minute.



You can also use the results of a fitness test to find how you compare with an average population. Find your score in the chart below in the proper column for your age group. (Data is from *ASCM Guidelines*, from 1994 research from the Institute for Aerobics Research in Dallas, Texas.)

Percentile Values for VO₂max

Percentile	Age				
	20-29	30-39	40-49	50-59	60+
Men					
90	51.4	50.4	48.2	45.3	42.5
80	48.2	46.8	44.1	41.0	38.1
70	46.8	44.6	41.8	38.5	35.3
60	44.2	42.4	39.9	36.7	33.6
50	42.5	41.0	38.1	35.2	31.8
40	41.0	38.9	36.7	33.8	30.2
30	39.5	37.4	35.1	32.3	28.7
20	37.1	35.4	33.0	30.2	26.5
10	34.5	32.5	30.9	28.0	23.1
Women					
90	44.2	41.0	39.5	35.2	35.2
80	41.0	38.6	36.3	32.3	31.2
70	38.1	36.7	33.8	30.9	20.4
60	36.7	34.6	32.3	29.4	27.2
50	35.2	33.8	30.9	28.2	25.8
40	33.8	32.3	29.5	26.9	24.5
30	32.3	30.5	28.3	25.5	23.8
20	30.6	28.7	26.5	24.3	22.8
10	28.4	26.5	25.1	22.3	20.8

How to Use Your Results

Test Specific Issues

Note that the absolute accuracy of this test is approximately +/- 15% compared to a laboratory maximal test. (See Swain and Leutholtz, *Metabolic Calculations*, page 63). The results on the TS1 should be somewhat better since it uses an improved maximum heart rate formula (see *Appendix A*).

The repeatability accuracy, from test to test with the same test subject, should be much better, probably within +/- 7%.

Other Functions

In This Chapter:

Other Fun Stuff



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Happy Workout and Electronic In/Out

Happy Workout: This allows riders to perform a virtual (i.e., imaginary) world-class workout. The TS1 thinks the rider is generating six times as much power as he really is, and all the related workout data like speed and calories are accelerated as a result. One use of Happy Workout is to allow easier demonstration of the TS1 to serious riders.

Enable Happy Workout under the Advanced Options key after enabling it in Setup Mode.

Electronic Input and Output: The TS1 provides two communication ports, labeled “Comm” and “Aux.” They use the CSAFE standard, typically to provide power to and communicate with a channel- and volume-control device for a sports club entertainment system such as BroadcastVision® or Cardio Theater®. The Audio Remote keys generate these control signals.

The Comm port also supports the full CSAFE Level 3 communications specification for use with fitness equipment networks (see <fitlinxx.com/csafe/specification.htm>)

The Video In port is not currently used.



Creating an Exercise Plan

In This Chapter:

*The F.I.T. Concept Defined
Utilizing the F.I.T. Concept
Beginning Your F.I.T. Program
Establishing and Maintaining Fitness
A Sports Training Program*

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What is the F.I.T. Concept?

The workout portion of your exercise program consists of three major variables: Frequency, Intensity, and Time.

Frequency: How Often You Exercise

You should exercise three to five times a week to improve your cardiovascular and muscle fitness. Improvements are significantly smaller with less frequent exercise.

Intensity: How Hard You Exercise

Intensity of exercise is reflected in your heart rate. Exercise must be sufficiently rigorous to strengthen your heart muscle and condition your cardiovascular system. Only your doctor can prescribe the target training heart range appropriate for your particular needs and physical condition.

Start with exercise that stimulates you to breathe more deeply.

Alternate days of moderate and easy exercise to help your body adapt to new levels of exertion without unnecessary strain.

If you are just beginning an exercise program, you may be most comfortable using your TS1 at low workloads. As you use your TS1 regularly, higher workloads may be more comfortable and more effective.

If you feel out of breath before you have exercised 12 minutes, you are probably exercising too hard.

As your fitness level improves, you will need to increase your workout intensity in order to reach your target heart rate. The first increase may be necessary after two to four weeks of regular exercise. Never exceed your target heart rate zone. Increase the workload on the TS1 to raise your heart rate to the level recommended by your doctor.

METs

One MET is the amount of energy your body uses when you're resting. If a physical activity has an equivalent of six METs, its energy demands are six times that of your resting state. The MET is a useful measurement because it accounts for differences in body weight. See *Appendix C* for more details.

Time: How Long You Exercise

Sustained exercise conditions your heart, lungs, and muscles. The longer you are able to sustain exercise within your target heart range, the greater the aerobic benefits.

To begin, maintain two to three minutes of steady, rhythmic exercise and then check your heart rate.

The initial goal for aerobic training is 12 continuous minutes.

Increase your workout time approximately one or two minutes per week until you are able to maintain 20-30 continuous minutes at your training heart rate.

Using the F.I.T. Concept

The F.I.T. concept is designed to help you begin a program tailored to your needs. You may wish to keep an exercise log to monitor your progress.

Your Fitness Program

You can get valuable fitness benefits from your TS1. Using the TS1 regularly may increase the ability of your heart and lungs to supply oxygen and nutrients to exercising muscles over an extended period of time. The TS1 will also help you develop added muscle endurance and balanced strength throughout your body.

Calculate your maximum heart rate as a first step in developing your fitness program. The formula to calculate average maximum heart rate for one minute is:

$$205.8 - (0.685 * \text{age})$$

See *Appendix A* for the source of this formula.

To find your pulse, locate a vein on your neck or inside your wrist, then count beats for ten seconds, then multiply by six.

It's also important to know your target training zone or target heart rate. The American College of Sports Medicine (ACSM) suggests 55% to 65% for lower-conditioned users, 75% to 80% for moderately conditioned users, and up to 90% for well-conditioned users. (See *Appendix D*.)

Beginning Your F.I.T. Program

CHAPTER EIGHT: CREATING AN EXERCISE PLAN

In addition to monitoring your heart rate as you exercise, be certain of how quickly your heart rate recovers. If your heart rate is over 120 beats per minute five minutes after exercising, or is higher than normal the morning after exercising, your exertion may be too strenuous for your current level of fitness. Reducing the intensity of your workout is recommended.

The age-adjusted target heart rates indicated in *Appendix A* reflect averages. A variety of factors (including medication, emotional state, temperature, and other conditions) can affect the exercise heart rate appropriate for you.

Warning: Consult your doctor to establish the exercise intensity (target heart rate zone) appropriate for your age and condition before beginning any exercise program.

Warm-Up: Slow and Deliberate Exercise

You are not warmed up until you begin to perspire lightly and breathe more deeply. Warming up prepares your heart and other muscles for more intense exercise and helps you avoid premature exhaustion. Start slowly, exploring different workloads until you can comfortably sustain your exercise level. A good suggestion is a minimum of three minutes. Perspiration on your brow is a good indicator of a thorough warm-up. The older you are, the longer your warm-up period should be.

Workout: Brisk and Rhythmic Exercise

The workout trains and conditions your heart, lungs, and muscles to operate more efficiently. Increase exercise in response to your heart rate to train and strengthen your cardiovascular system. Concentrate on exercising smoothly.

Beginning Your Exercise Program



Your F.I.T. Program Continued

CHAPTER EIGHT: CREATING AN EXERCISE PLAN

Cool-Down: Slow and Relaxed Exercise

Cooling down relaxes your muscles and gradually lowers your heart rate. Slowly reduce your workload until your heart rate is below 60 percent of your maximum heart rate. The cool down should last at least five minutes, followed by some light stretching to enhance your flexibility.

Beginning a Fitness Program

If you cannot sustain 12 continuous minutes in your target heart rate zone, exercise several times a day to get into the habit of exercising.

Try to reach and maintain 60-65 percent of your maximum heart rate. Alternate exercise with periods of rest until you can sustain 12 continuous minutes of exercise at 60-65 percent of your maximum heart rate.

Begin exercising in three to five minute sessions.

Establishing Aerobic Fitness

If you can sustain 12 but not 20 continuous minutes of exercise in your target heart rate zone:

Exercise three to five days a week.

Rest at least two days per week.

Try to reach and maintain 60-75 percent of your maximum heart rate with moderate rhythmic exercise.

Begin with 12 continuous minutes. Increase your time by one to two minutes per week until you can sustain 20 continuous minutes.



If you can sustain 20 continuous minutes in your target heart rate zone, begin to increase the length and intensity of your workout:

Exercise four to six days a week or on alternate days.

Try to reach and maintain 70-85 percent of your maximum heart rate with moderate to somewhat hard exercise.

Exercise for 20-30 minutes.

Consistent aerobic exercise will help you change your body composition by lowering your percentage of body fat. If weight loss is a goal, combine an increase in the length of your workouts with a moderate decrease in caloric intake. For weight control, how long and how often you exercise is more important than how hard you exercise.

- Exercise four to five times a week.
- Try to reach and maintain 60-75 percent of your maximum heart rate with moderate exercise.
- Exercise for 30-45 minutes at 60-65 percent of your target heart rate.

Here are some tips to achieving your weight management goal:

- Consume most of your dietary calories at breakfast and lunch, and eat a light dinner. Do not eat close to bedtime.
 - Exercise before meals. Moderate exercise will help suppress your appetite.
 - Take exercise breaks throughout the day to help increase metabolism (calorie expenditure).
-

Maintaining Aerobic Fitness

Managing Weight

Sports Training

When you are training to improve strength and performance:

- Exercise four to five days a week. Alternate exercise days and intervals of hard to very hard exercise with easy to moderate exercise.
- Exercise for 30 minutes or longer.

Warning: these strategies are intended for average healthy adults. If you have pain or tightness in your chest, an irregular heartbeat, shortness of breath or if you feel faint or have any discomfort when you exercise, **Stop!** Consult your physician before continuing. Remember, every workout should begin with a warm-up and finish with a cool-down.

Set-Up Mode

In This Chapter:

*Getting Into Setup Mode
Customizable Options
Odometers*



Chapter 1: Riding Your TS1
Chapter 2: The Display
Chapter 3: Pre-Set Programs
Chapter 4: Heart Rate Control
Chapter 5: Calorie Goal Workout
Chapter 6: Fitness Test

Chapter 7: Other Functions
Chapter 8: Creating an Exercise Plan
Chapter 9: Setup Mode
Chapter 10: Test Mode
Chapter 11: Care and Maintenance
Chapter 12: Important Safety Instructions

How to Get Into Setup Mode

- Press and hold **CLEAR**. As the display resets, press and hold **Enter**.
- At the five-digit “Pass Code” prompt, enter 1 0 1 0 1. If you make a mistake, start entering the code from the beginning. Press **Enter**.
- Press **Enter** to move from one setting to the next. Press + and – keys to change values, then press **Enter** to accept that value. Press and hold **CLEAR** to exit setup mode.

Customizable Options

CHAPTER NINE: SETUP MODE

Language: English only is supported at this time.

Units: English (default) or metric.

Max Time: From 1 to 98 minutes, and unlimited. Thirty minutes is the default.

Default Time: This is the workout time Workout Setup first suggests. From 1 to 98 minutes, never greater than maximum time. Twenty minutes is the default.

Pause Time: Various times, plus DISABLE for unlimited pause.

Pulse Priority: If two heart rate signals are detected, this setting determines which is displayed.

Manual Operation: Simple 25 levels, or Watts 10-watt increments.

Display Watts: Watts will be displayed in place of METs.

Sound Enable: Tones are on (default) or off.

SmartStart Enable

Happy Mode: Adds Happy Mode under Advanced Options key.

CSAFE Enable: Turns on CSAFE network communications.

CSAFE Auto: TS1 will auto-announce itself to the network when it powers up.

Default Weight: Suggested body weight.

Customizable Options



More Custom Options

CHAPTER NINE: SETUP MODE

Customizable Options (cont.)

True recommends you do not change the following settings:

Cals Slope

Cals Offset

Power Factor

Left Backlight

Right Backlight

Lower Backlight

Upper Contrast

Lower Contrast

Factory Defaults



Test Mode

In This Chapter:

- How to Get Into Test Mode*
- How to Use Test Mode*
- What the Data Readouts Mean*
- More Data Readouts*
- Diagnostic LEDs*



- Chapter 1: Riding Your TS1
- Chapter 2: The Display
- Chapter 3: Pre-Set Programs
- Chapter 4: Heart Rate Control
- Chapter 5: Calorie Goal Workout
- Chapter 6: Fitness Test

- Chapter 7: Other Functions
- Chapter 8: Creating an Exercise Plan
- Chapter 9: Setup Mode
- Chapter 10: Test Mode**
- Chapter 11: Care and Maintenance
- Chapter 12: Important Safety Instructions

How to Get Into Setup Mode

- Press and hold **CLEAR**. As the display resets, press and hold **Enter**.
 - At the five-digit “Pass Code” prompt, enter 2 0 1 7 3 . If you make a mistake, start entering the code from the beginning. Press **Enter**.
 - Press **Enter** to move from one test to the next. Press **Start** to begin the test. When in a test, press **Start** again to move to the next test. Press and hold **CLEAR** to exit test mode.
-

How to Use Test Mode

CHAPTER TEN: TEST MODE

EPROM Test: Software version.

Key Test: A diagram of the keypad is shown in the matrix display. Press each key to make that key's "dot" to disappear and to show a description of the key in the message center.

Display Test: Various tests of the LCD display.

Control Test: Direct readout of eddy coil current.

Heart Rate Test: Shows both Polar and contact heart rate signals.

RS232 Test: Not implemented at this time.

A/D Channels: Displays value from each of the analog inputs. Press (+) key to move to the next input. Inputs are load sense, brake sense, load control, left upper backlight, right upper back light and lower back light.

Brake/Pedal RPM: Shows both values at the same time.

Watchdog Test: Internal hardware test.

How to Use These Functions

Care and Maintenance

In This Chapter:

How to Care for Your TS1



- Chapter 1: Riding Your TS1
- Chapter 2: The Display
- Chapter 3: Pre-Set Programs
- Chapter 4: Heart Rate Control
- Chapter 5: Calorie Goal Workout
- Chapter 6: Fitness Test

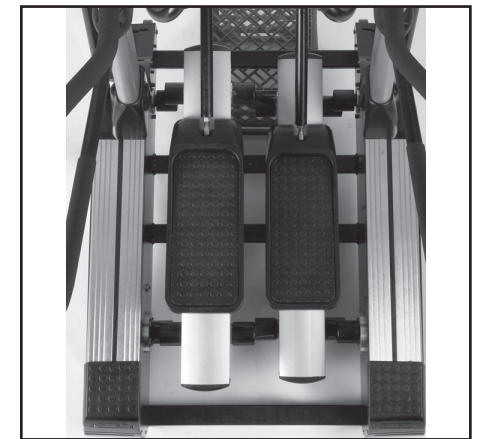
- Chapter 7: Other Functions
- Chapter 8: Creating an Exercise Plan
- Chapter 9: Setup Mode
- Chapter 10: Test Mode
- Chapter 11: Care and Maintenance**
- Chapter 12: Important Safety Instructions

Your TS1 doesn't require any routine maintenance, not even lubrication. Keeping it clean is the most important task.

After every workout: Perspiration should be wiped from the control console, contact heart rate pads, shrouds, and seat.



Weekly: Wipe down your TS1 once a week with a water-dampened soft cloth. Make sure to remove any debris from the footskate track. On the contact heart rate pads, use a glass cleaning solution. Be careful not to get excessive moisture between the edge of the overlay panel and the console, as this might create an electrical hazard or cause the electronics to fail.



Expert service and maintenance at a reasonable cost are available through your factory-trained, authorized True Fitness dealer. The dealer maintains a stock of repair and replacement parts and has the technical knowledge to meet your service needs.

Important Safety Instructions

In This Chapter:

Review for Your Safety



Chapter 1: Riding Your TS1
Chapter 2: The Display
Chapter 3: Pre-Set Programs
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Chapter 5: Calorie Goal Workout
Chapter 6: Fitness Test

Chapter 7: Other Functions
Chapter 8: Creating an Exercise Plan
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Chapter 11: Care and Maintenance
Chapter 12: Important Safety Instructions

When using this exercise machine, basic precautions should always be followed, including the following:

Read all instructions before using this the TS1.

Consult your physician before beginning any exercise program.

Do not use if you have an acute cold or fever.

Warning: to reduce the risk of burns, fire and electric shock and injury to persons, follow these instructions:

Danger: To reduce the risk of electric shock, always unplug it immediately after use and before cleaning.

Unplug it from the outlet when not in use and before any service is performed.

Keep the power cord away from heated surfaces.

Never operate the TS1 if it has a damaged power cord or plug, if it is not working properly, if it has been damaged or dropped, or if it has been submerged in water. In these cases, the TS1 should be examined by a qualified service technician.

Review for Your Safety

CHAPTER TWELVE: IMPORTANT SAFETY INSTRUCTIONS

Other safety precautions:

Close supervision is necessary when the TS1 is being used by or near children, or disabled persons.

Use the TS1 only for its intended use as described in this manual.

Do not use attachments not recommended by the manufacturer.
Never drop or insert any object into any opening.

Do not allow animals on or near your TS1.

Use the TS1 indoors only.

Never use your TS1 near water or while wet. Using the TS1 around a pool, hot tub or sauna will void the warranty.

Do not operate where aerosol (spray) products are being used or where oxygen is being administered.

Allow only trained personnel to service this equipment.

Avoid the possibility of bystanders being struck or caught between moving parts by making sure that they are out of reach of the TS1 while it is in motion.

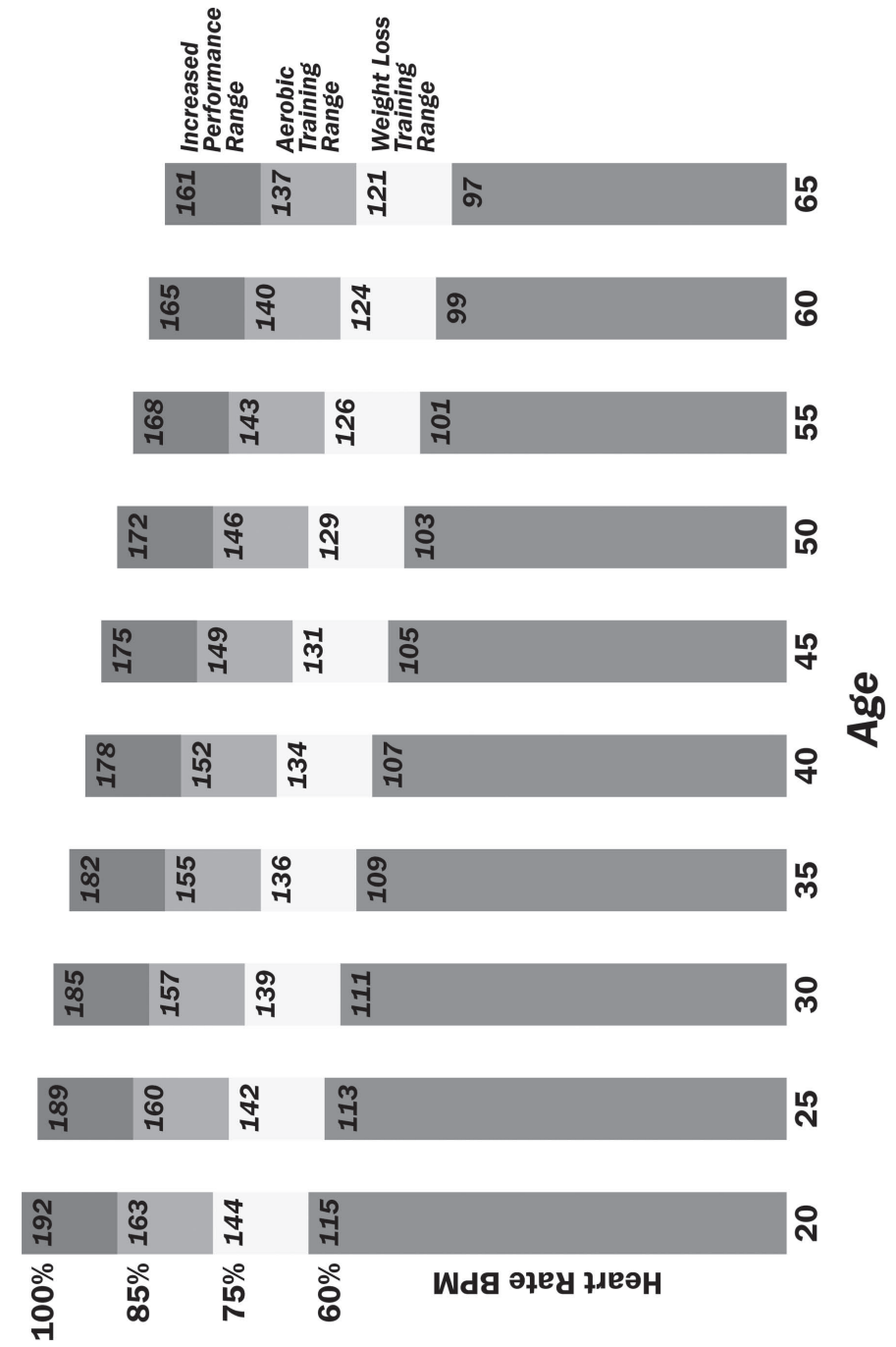
Allow only one person at a time on the TS1.

Appendix A

*Maximum Heart Rate and
Target Heart Rate*

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Target Heart Rate Chart



Contact heart rate monitoring (perhaps more accurately called hand-touch heart rate monitoring) uses the same principles as chest strap monitoring: electrically conductive pads detect the faint electrical signals produced by a beating heart and are converted to a data signal which can then be displayed digitally as a numeric beats per minute value.

The only difference is that a chest strap is right next to the heart, so the signals are relatively strong. Contact heart rate (CHR) using the fingers and palms receives an inherently much fainter signal. This is the sole reason for the performance differences between the two systems. This is also the reason why CHR systems must typically use two pads per side for a total of four detection pads, while a chest strap uses just one pad per side; the extra pads are required to help detect the fainter signal.

The electrical signals detected by heart rate monitoring systems are a side-effect of the electrical control signals the heart generates to fire its muscles in the right sequence. The signals start in the top, or upper-right part of the heart (known as the sinoatrial node), then travel down to the bottom, or lower-left part of the heart (known as the Purkinje fibers). It is the fact that the heart is tilted in the chest cavity, and thus these signals move from the right to the left side of the body, that makes it possible for monitoring pads on each side of the body to detect the heart rate. (The CHR pads correspond roughly to leads I and III in a standard 12-lead ECG setup.)

If a person's heart is tilted less than average, the signal is weaker. (Note that this is not indicative of heart strength or health.) In some people, their heart is nearly vertical in their chest, and even a chest strap cannot pick up their heart rate signal. (12-pad medical ECG systems still work well on such an individual.) Less than 1% of the population are in this category.

**CONTACT
HEART RATE
MONITORING**

**Check
With Your
Physician**

Remember to check with your physician before beginning any exercise program. She can help determine an appropriate target heart rate. Medications often affect heart rate.

**A New
HRmax
Equation**

Robert Robergs, editor of the prestigious Journal of Exercise Physiology, conducted a study in 2002 of the maximal heart rate equation $220 - \text{age}$. He found this equation "has no scientific merit for use in exercise physiology and related fields."

In his survey of research in this area, Robergs found several other simple equations that were significantly more accurate. The best equation he found was derived in 1994 by Oten Inbar:

$$205.8 - (0.685 * \text{age})$$

The TS1 uses the Inbar equation. Even though this is the best available equation, it still has a possible range of error of +/- 6 beats per minute.

Other similar equations that are also more accurate than $220 - \text{age}$ are:

$$206.3 - (0.711 * \text{age}) \text{ (Londeree, 1982)}$$

$$206.0 - (0.700 * \text{age}) \text{ (Tanaka, 2001)}$$

$$208.8 - (0.734 * \text{age}) \text{ (Robergs meta study, 2002)}$$

Roberg's paper can be found here: <<http://www.asep.org/Documents/Robergs2.pdf>>

Appendix B

Maximal Oxygen Uptake and METs

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VO₂Max	<p>Maximal oxygen uptake, or VO₂max, is considered the best single measurement of cardiovascular fitness. It represents the peak rate of your body's oxygen consumption capability, which is important because this is one of the two biggest factors in endurance performance.</p> <p>(The other big endurance factor is the <i>lactate threshold</i>, which is the exercise level at which blood lactate begins to accumulate above resting levels. The lactate threshold is much more difficult to measure than VO₂max, which is why VO₂max is the accepted standard.)</p> <p>The only accurate way to measure VO₂max is to use a laboratory-grade respiratory diagnostic system during a maximal exercise test. All other methods produce an estimate with varying degrees of accuracy.</p> <p>Serious training results in an average improvement in VO₂max of 20%, and all this takes place in 8 to 12 weeks. Additional performance improvement after this time is a result of a higher lactate threshold and, to a lesser degree, increased biomechanical efficiency.</p> <p>(See Wilmore & Costill, <i>Physiology of Sport and Exercise</i>, pages 140-141, and <i>ACSM Guidelines</i>, page 68).</p> <p>VO₂max is expressed in milliliters of oxygen per minute per kilogram of body weight, or ml/min/kg.</p> <hr/>
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Appendix B

METs are defined as the ratio of the current body energy expenditure rate compared with basal metabolic rate (BMR):

$$\text{METs} = (\text{VO}_2 \text{ rate of current state}) / 3.5$$

where 3.5 represents BMR. VO_2 (oxygen uptake) and 3.5 are in units of ml/kg/minute of oxygen consumed by the body. This oxygen consumption rate corresponds to about 72 calories per hour for a 150-pound person.

MET Explanation

Appendix C

*American College of Sports
Medicine Position Stand on
Exercise and Fitness*

TRUE

Introduction

In 1998, the American College of Sports Medicine completed their most important position stand, titled, “The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness in healthy adults.” The ACSM is recognized as the premier authority in this area, so this document describes the current consensus among exercise physiologists and coaches.

(Also note that the ACSM is a fairly conservative body, so they only make recommendations when there are compelling reasons.)

The following is a summary of the document. The full document can be found on the ACSM’s journal’s website:

<<http://ipsapp006.lwwonline.com/content/getfile/2320/20/1050/fulltext.htm>>

**The
Summary of
the Position
Stand**

The variables of frequency, intensity, and duration of exercise quantify the degree of overload stimulus in an exercise program. In general, the greater the stimulus the greater the training effect. All three types of exercise (cardiovascular, resistance, and flexibility) should be included in a training program.

Cardiovascular training is especially sensitive to frequency and intensity; the minimums for developing and maintaining fitness are at least ten minutes per day at a minimum of 50% VO_2 max at least two days per week. Proper warmup and cooldown, including flexibility, are recommended.

Appendix C

Training should be three to five days per week at between 55% and 90% maximum heart rate. Deconditioned individuals should stay between 55% and 64%. Total duration of training should be between 20 and 60 minutes, with the time varying inversely with intensity. High-intensity, short duration exercise is generally only recommended when training for non-athletic competition.

Adequate exercise intensity requires the use of large muscle groups, which typically means legs and buttocks. In some cases, shoulders and upper back muscles used in rigorous swimming will be adequate.

Resistance training should consist of one set of 8 to 10 exercises that stimulate all the major muscle groups, two to three days a week. Multiple sets will not necessarily provide greater benefits, especially considering the significantly increased time requirements and adherence difficulties.

Flexibility exercises should stretch the major muscle groups a minimum of two to three times a week, and should include both static and dynamic techniques.

**Specific
Recommendations
For
Cardiorespiratory
Fitness and
Body
Composition**

**Specific
Recommendations
For Muscular
Strength And
Flexibility**

Appendix D

Specifications

ATRUE[®]

VO₂Max	<p>Workload Range: 30 – 600 watts.</p> <p>Weight: 420 pounds.</p> <p>Maximum User Weight: 350 pounds.</p> <p>Workload Control System: electronic eady-current brake</p> <p>Power Supply: 115V 60 Hz AC wall power. Power consumption: approximately 2A maximum</p> <hr/>
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Specifications and operation subject to change without notice.

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URL:

<ipsapp006.lwwonline.com/content/getfile/2320/20/1050/fulltext.htm>

Other ACSM position stands are found here:

<www.acsm-msse.org>

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