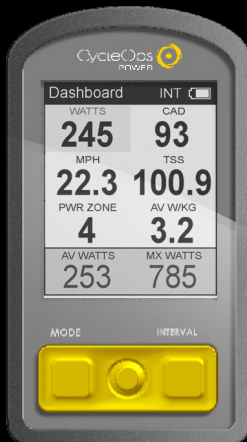


# CycleOps Joule™ 2.0

## User Guide



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## Chapter 1: Starting Out

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Visit [www.cycleops.com](http://www.cycleops.com) to learn more about Saris Cycling Group and:

- Register product and activate warranty
- View frequently asked questions
- View instructional videos
- Sign up for the CycleOps Power newsletter
- View product and technical updates from CycleOps Power

WARNING: Always consult a physician before beginning or modifying any exercise program.

### Unpacking Joule™

Remove all parts from the box to ensure the following contents are included:

#### PACKAGE CONTENTS:

Item	Part Description	Qty
1.	Joule™ 2.0 computer	1
2.	Chest strap (optional)	1
3.	Stem/handlebar mount	1
4.	Zip ties	4
5.	Training with Power DVD	1
6.	PowerAgent CD w/Complete User Guides	1
7.	USB cable	1

Please contact the local dealer or Saris Cycling Group with any questions at 1-800-783-7257.

## Chapter 1: Starting Out

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### Mount

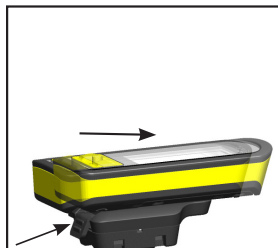
The CycleOps Joule™ 2.0 mount can be used in either stem or handlebar orientations. The mount is preassembled for the stem orientation.



1. For stem orientation insert two zip ties through bottom of mount and secure to stem.



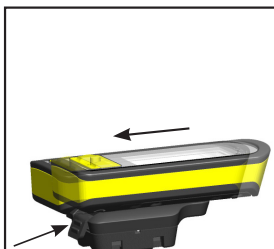
2. Slide Joule™ down above mount.



3. Slide Joule™ forward into mount.



4. Be sure to check Joule™, is secure in mount.



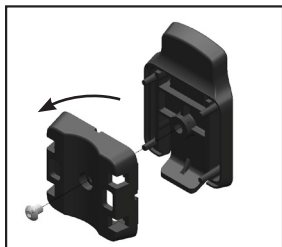
5. To remove Joule™, press down on the release lever and slide Joule™ back.

## Chapter 1: Starting Out

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### Mount

If desired, change from the preassembled stem orientation to a handlebar orientation.



1. Remove screw that holds bottom of mount and rotate bottom 90 degrees.



2. Insert screw through bottom of mount.



3. Insert two zip ties through bottom of mount. Tighten by pulling on the zip ties to secure mount.



4. Handlebar orientation.

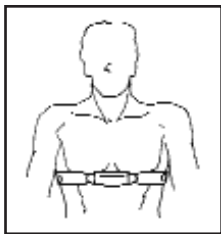
## Chapter 1: Starting Out

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### HEART RATE MONITOR

Position the heart rate monitor strap above torso as pictured. The strap should rest just beneath the pectoralis muscles of the chest. For best results slightly moisten the electrodes where contact is made with skin. The heart rate strap must be worn to enable the heart rate function. It should be snug enough to stay in place during the ride.

**NOTE:** The chest strap for Joule™ uses a coded frequency and is not compatible with other manufacturer's chest straps. If heart rate is not displayed, consult Chapter 5: Sensors.



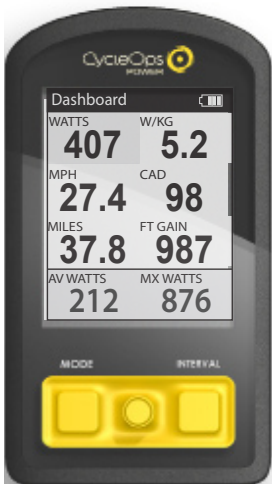
## Chapter 1: Starting Out

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### Battery

CycleOps Joule™ 2.0 is powered by a built-in lithium-ion battery that can be recharged using the included USB cable and a computer. A 5VDC 400mA charger can also be used (not included). A fully charged battery can run for approximately 20 hours before it must be recharged. Recharging completely will take approximately three hours. The battery level is indicated in the title bar.

**WARNING:** This product contains a Lithium battery. See Important Precautions section for more information on page %%.



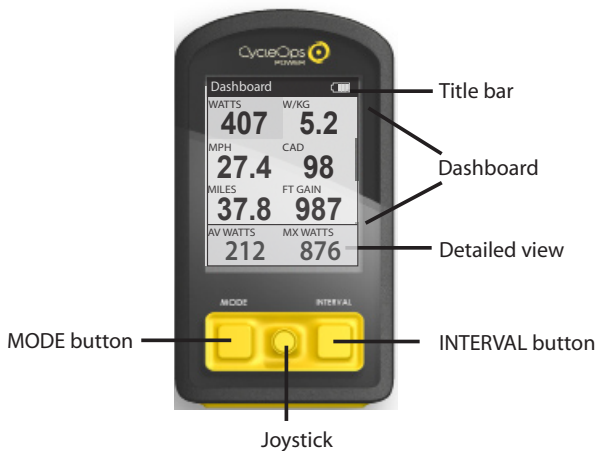
1. Press Mode or Interval button to turn on Joule™ 2.0. Note: Pressing joystick will not turn Joule™ 2.0 on.
2. Plug the mini-USB cable into the mini-USB port on the back of Joule™ 2.0 and plug the other end into an available USB port on a computer.
3. A standard AC adapter to wall outlet is available separately.

## Chapter 1: Starting Out

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### Display Actions

There are two buttons and a joystick to navigate Joule™ 2.0.





### Display Actions

Button + Action	Function	Detail	
Joystick	Press left/right	Move	Move within a screen or change screens
	Press up/down	Move	Move within a screen or scroll screen
	Press in and release	Switch	Switch metrics in dashboard, change date ranges in reports or select settings in menu
	Hold	Switch	Switch dashboard category settings
MODE	Press in and release	Switch	Switch between dashboard, reports, activities, menu
	Press in and release	Back	Navigate “back” in menu mode
	Hold for 2 seconds	Pause	Display “Ride Paused” screen
INTERVAL	Press in and release	Mark	Stop previous interval and mark next
	Hold for 2 seconds	Switch	Switch dashboard to “Interval Mode” (INT) metrics for that interval (i.e. avg watts) versus entire ride
MODE +	Hold for 2 seconds	Find	Initiates finding previously paired sensors
INTERVAL			

# Chapter 1: Starting Out

## Dashboard

mode:

To view customizable metrics while riding.

Dashboard	
WATTS	407 5.2
MPH	27.4 98
WATTS	37.8 987
AV WATTS	212 876

## Reports

mode:

To view how a current ride compares to previous rides.

Reports	
Summary	
TIME	2:00
1:45:33	00:59:45
MILES	75 125
KJ	432 376
TEMP	52 56
F	
AV WATTS	337 311
AV CAD	105 94
AV WATT	22 20
AV HR	167 165

Reports		
Power Detail		
WATTS	2:00	2:00
AV WATTS	378	299
MX WATTS	478	641
ZERO WATTS	00:05:12	00:09:06
NP	258	205
AV W/EG	3.1	2.2
MX W/EG	7.3	5.2

Reports	
Work	
2:00	2:00
KJ	653 329
KJ HR	289 482
TSK	3.7 1.0
W	2.0 3.1

Reports	
Peak Power	
2:00	2:00
5 SEC	910 839
5 SEC	779 791
5 MIN	759 653
5 MIN	748 801
30 MIN	533 476
30 MIN	512 419
60 MIN	349 382
60 MIN	291 196

Reports	
Time in Power Zones	
2:00	2:00
1	00:15:04 00:12:33
2	00:20:22 00:24:51
3	00:44:16 00:49:23
4	01:00:29 01:01:44
5	00:13:34 00:12:31
6	00:08:03 00:05:01
7	10% 12%
8	15% 14%
9	30% 23%
10	41% 45%
11	12% 11%
12	3% 5%

## Activities

mode:

To view what should be done while riding (intervals, courses and workouts).

Activities	
Intervals	
4	2:00 0:00:00 750 99999 9
3	2:00 0:00:00 250 99999 9
2	2:00 0:00:00 750 99999 9
1	2:00 0:00:00 750 99999 9

## Menu

mode:

To setup preferences, manage workouts, history and sensors.

Menu	
Main	
Sensors	>
Setup Joule	>
Setup User	>
Workouts	>
History	>
<	Exit Menu

# Chapter 1: Starting Out

---

Reports		Climbing	
3:39P	2:36P	3:39P	2:36P
1	00:09:51	00:07:31	
2	00:05:09	00:09:45	
3	00:49:03	00:35:14	
4	00:19:58	00:15:32	
5	00:05:02	00:03:21	
1	11%	10%	
2	9%	13%	
3	70%	40%	
4	21%	18%	
5	6%	8%	

Reports		Climbing	
3:39P	2:36P	3:39P	2:36P
FT	2156	958	
GAIN			
AV	10%	15%	
GRADE			
FT	226	112	
LOST			
NAME	340	509	

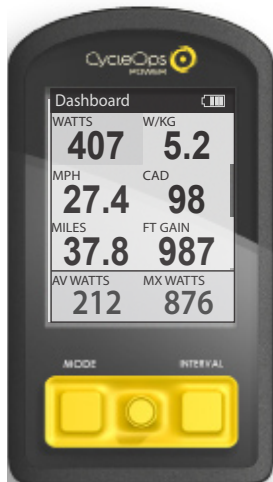
  

Reports		Surges	
3:39P	2:36P	3:39P	2:36P
-4	5	4	
W/BL			
-6	7	9	
W/BL			
-8	11	10	
W/BL			
-10	13	15	
W/BL			

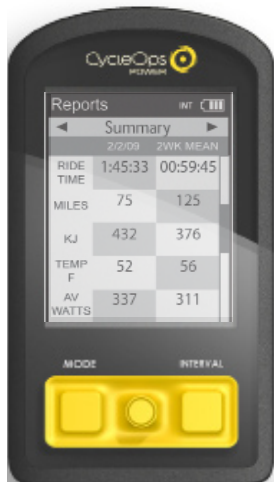
## Chapter 1: Starting Out

### Navigation

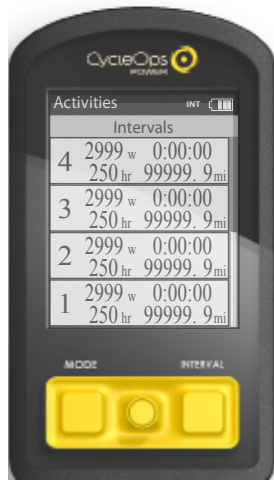
Joule™ has four modes of functionality: dashboard, reports, activities and menu indicated by the title bar.



1. Press the MODE button once to switch from dashboard mode to report mode.



2. Press the MODE button again to switch from report mode to activities mode.



3. Press the MODE button again to switch from activities mode to menu mode.

## Chapter 1: Starting Out

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### Navigation

Joule™ has four modes of functionality: dashboard, reports, activities and menu indicated by the title bar.

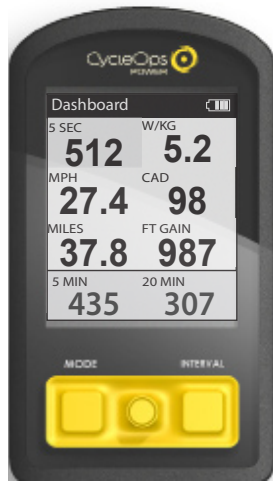
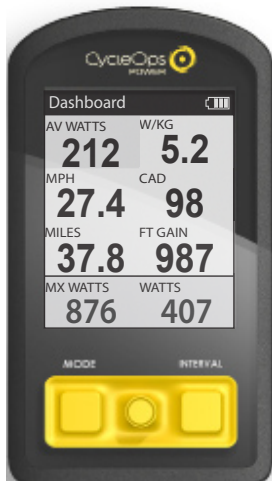
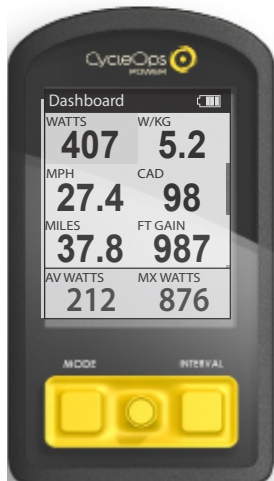


4. Press the MODE button again to switch from menu mode back to dashboard mode.

## Chapter 2: Dashboard Mode

### Navigation

The dashboard shows current ride data. It displays 6 metrics that can easily be configured to create a customizable dashboard. The detailed view shows additional data from the highlighted group in the dashboard.



1. Move joystick to the desired metric. Note: it is shaded.

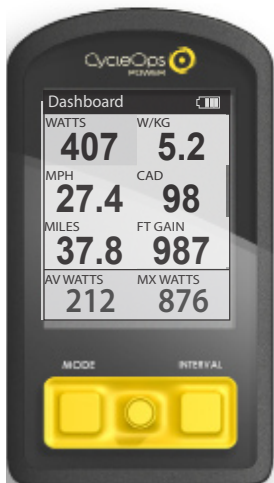
2. Press joystick to rotate metrics from detailed view to dashboard. (Example: watts, av watts, mx watts). In order to change detailed view, move joystick to desired metric.

3. Press in and hold joystick to change and switch through available categories. Note: Press in and hold MODE button to pause a ride or stop, save and/or delete ride. Once a ride is stopped and saved, it is added to the Reports and History calculation.

## Chapter 2: Dashboard Mode

### Dashboard Categories

To customize the dashboard, choose 6 categories from the following 12 available categories. Each dashboard category is made up of 3 metrics.

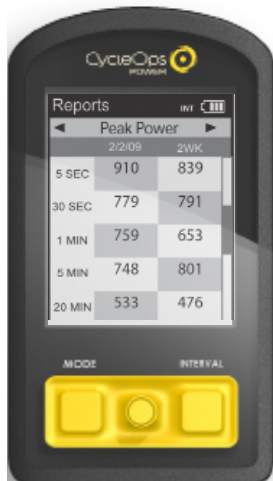
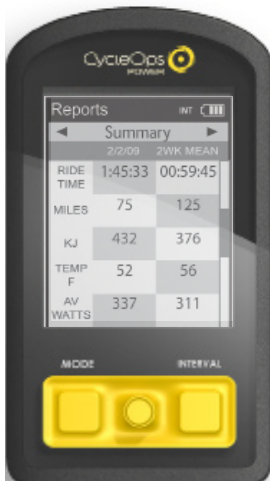


Category	Metric 1	Metric 2	Metric 3
Power	watts 2999	average watts 2999	maximum watts 2999
Watts/kg	watts/kg 20.0	average watts/kg 20.0	maximum watts/kg 20.0
Zones	current power zone 6	average power zone 4.2	heart rate zone 3
Peak Power	5sec Peak Power 2999	5min Peak Power 2999	20 min Peak Power 2999
Scores	training stress score 500.1	normalized power 2999	intensity factor 2.000
Work	kilojoules 9999	kilojoules / hour 9999	training stress score 9999
Cadence	rpm 250	average rpm 250	maximum rpm 250
Heart Rate	heart rate 250	average heart rate 250	maximum heart rate 250
Speed	current speed 99.9	average speed 99.9	maximum speed 99.9
Climbing	current grade 45.0	current altitude ft or m 2999	total ascent ft or m 9999
VAM	vertical ascent 45.0	current altitude ft or m 2999	total ascent ft or m 9999
Ride	ride time 99:59:59	ride distance 99.99	time of day 12:59

## Chapter 3: Reports Mode

### Navigation

Joule™ provides eight reports with an easy comparison of the current ride and historical averages so information can be seen in context.



1. Press joystick left/right to page through eight reports. Press joystick up/down to scroll screen. The left column of data displays the current ride. The right column displays an average of the rides completed over the selected time frame. Note: the highlighted metrics represents the higher of the two metrics.

2. Press in and release joystick to change date ranges.



## Chapter 3: Reports Mode

### Report Details

Joule™ provides eight reports that provide an easy comparison of the ride and historical averages so information can be seen in the context. See Definition of Terms for an explanation of metrics on page %.

Reports		
Summary		
	2/2/09	2WK MEAN
RIDE TIME	1:45:33	00:59:45
MILES	75	125
KJ	432	376
TEMP F	52	56
AV WATTS	337	311
AV CAD	105	94
AV MPH	22	20
AV HR	167	165

Basic information with minimal manipulation or calculation and how they compare to previous rides. Note: Ride time equals time moving. Average watts is calculated without zeros and is time weighted.

Reports		
Power Detail		
	2/2/09	2WK
AV WATTS	378	299
MX WATTS	478	641
ZERO WATTS	00:05:12	00:09:06
ZERO WATTS	10%	6%
NP	258	205
AV W/KG	3.1	2.2
MX W/KG	7.3	5.2

In depth view of power specific information for new insight into ride intensity and characteristics. Includes normalized power, watter per kilogram of body weight and time spent at zero watts.

Reports		
Work		
	2/2/09	2WK
KJ	653	329
KJ/HR	289	482
TSS	3.7	1.0
IF	2.0	3.1

Key measures for quantifying work completed, including TrainingPeaks' Training Stress Score (TSS) and Intensity Factor (IF).

Reports		
Peak Power		
	2/2/09	2WK
5 SEC	910	839
30 SEC	779	791
1 MIN	759	653
5 MIN	748	801
20 MIN	533	476
30 MIN	512	419
40 MIN	349	382
60 MIN	291	196

Full array of peak power data for indication of ride intensity at key physiological markers of current fitness compared to previous performances.

## Chapter 3: Reports Mode

Reports		
Time in Power Zones		
	2/2/09	2WK
1	00:15:04	00:12:33
2	00:20:22	00:24:51
3	00:44:16	00:49:23
4	01:00:29	01:01:44
5	00:13:34	00:12:31
6	00:08:03	00:05:01
1	10%	12%
2	15%	14%
3	30%	23%
4	41%	45%
5	12%	11%
6	3%	5%

Time spent in physiological relevant power zones in absolute minutes and as a percent of total time.

Reports		
Time in HR Zones		
	2/2/09	2WK
1	00:09:51	00:07:31
2	00:05:09	00:09:45
3	00:49:03	00:35:14
4	00:19:58	00:15:32
5	00:05:02	00:03:21
1	11%	10%
2	9%	13%
3	70%	40%
4	21%	18%
5	6%	8%

Time spent in physiological relevant heart rate zones in absolute minutes and as percent of total time.

Reports		
Climbing		
	2/2/09	2WK
FT GAIN	2156	958
AV GRADE	10%	15%
FT LOST	226	112
VAM	349	509

Detailed indication of climbing including total altitude gained and lost, vertical ascent (VAM) and grade.

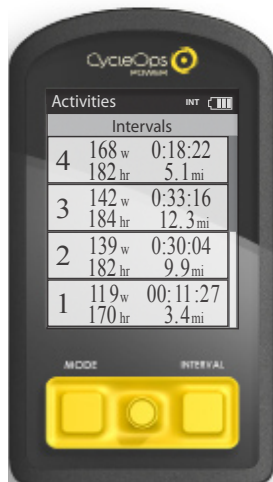
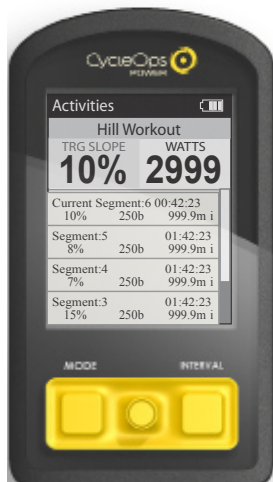
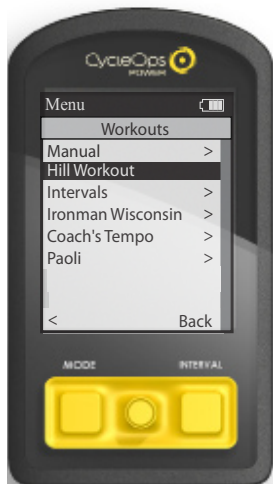
Reports		
Surges		
	2/2/09	2WK
>4 W/KG	5	4
>6 W/KG	7	9
>8 W/KG	11	10
>10 W/KG	13	15

Quantification of how many accelerations or “matches” were burned during a ride over 4, 6, 8 and 10 watts per kilogram. Note: A surge is counted whenever three consecutive values (someword) w/kg value and recorded.

## Chapter 4: Activities Mode

### Activities Overview

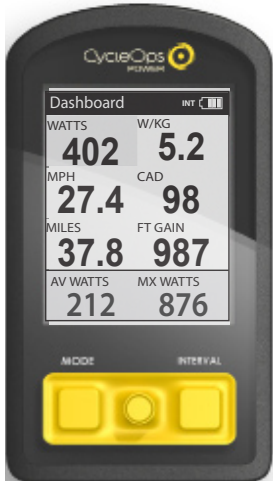
Joule™ activities mode manages intervals and workouts.



## Chapter 4: Activities Mode

### Intervals

Intervals may be viewed from activity mode or dashboard mode.



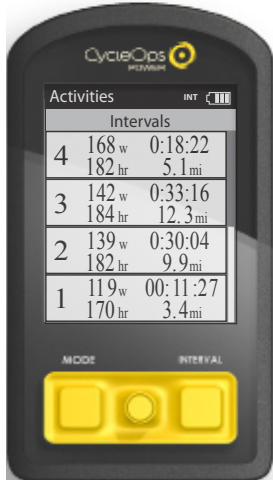
1. Intervals can be marked at any point during the ride and from any mode by pressing INTERVAL button.

2. To view intervals from the dashboard hold INTERVAL button until "INT" is displayed in the title bar. Note: All dashboard data now pertains to the active interval only.

3. To exit interval mode, hold INTERVAL button again.

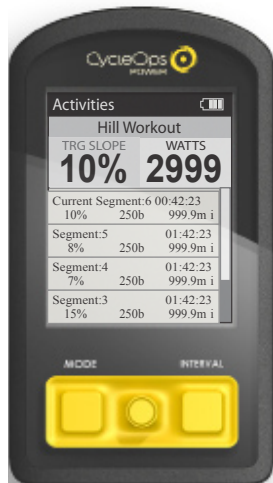
4. To view all interval data press MODE button to navigate to activity mode.

Note: Activity mode shows all intervals completed with the current interval at the top of the list. Average power, heart rate, interval time and distance are displayed for each interval.



### Scripted Workouts

Joule™ allows for three types of workouts: scripted, manual and courses. Script workouts allow for a list of workout parameters to be followed versus carrying a piece of paper. Manual workouts are compatible with the CycleOps 400 Pro indoor cycle and PowerBeam trainer only and allow for precise control over a target power or slope. Courses are also only compatible with the CycleOps 400 Pro indoor cycle and PowerBeam trainer and allow for duplication of a terrain based profile, such as a favorite outdoor course or ride.



1. Create scripted workout using PowerAgent software.
2. Title and save scripted workout in PowerAgent and transfer to JOULE™.
3. Press MODE button to navigate to menu mode.
4. Select Workouts
5. Select Hill Workout
6. Joule™'s activity mode will now display the scripted workout.

### Manual Workouts

Controlled resistance technology can take workouts to the next level with target based training. There are two types of controlled resistance units: PowerBeam Pro trainer and 400 Pro indoor cycle. Choose to alter the target wattage or slope. The gearing may be changed on the 400 Pro indoor cycle. Note: A manual workout will only work with a controlled resistance unit.



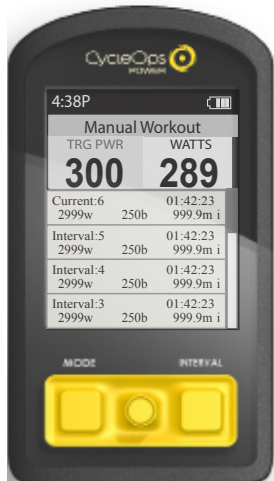
1. Press MODE button to navigate to menu mode.

Note: A manual workout will begin automatically if Joule is paired to a controlled resistance unit.

2. Select manual workout. Within activity mode the manual resistance control is in the upper left box and current power is in the top right hand box.

3. Press Joystick in to change resistance type. Gearing can be adjusted on a 400 Pro Indoor Cycle.

Note: Intervals may still be marked by pressing INTERVAL button. Scroll intervals by pressing joystick up/down.



## Chapter 4: Activities Mode

### Course Workouts

Controlled resistance technology can take workouts to the next level with target based training. There are two types of controlled resistance units: PowerBeam trainer and 400 Pro indoor cycle. Choose to alter the target slope. The gearing change be changed on the 400 Pro indoor cycle.



1. Take outdoor ride or emailed file and convert to workout using PowerAgent software. Note: Workouts can also be built based in PowerAgent based on slope.
2. Title and save course workout in PowerAgent and transfer to Joule™.
3. Press MODE button to navigate to menu mode.
4. Select course workout (i.e. Ironman Wisconsin).
5. Press in joystick to change between target slope or target watts.
6. Press joystick up/down to adjust target slope. Gearing can be adjusted on indoor cycle.

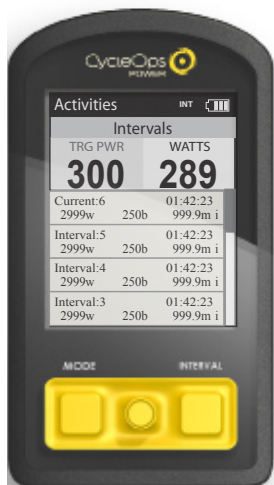
Note: Courses can only be ridden with a controlled resistance unit, like the CycleOps 400 Pro indoor cycle and PowerBeam trainer.



## Chapter 4: Activities Mode

### Pausing, Saving or Deleting a Workout

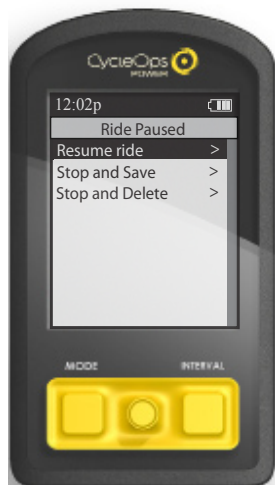
A workout, like any ride can be paused, saved or deleted.



1. Hold the MODE button to access ride paused screen.

2. Move joystick to up/down to pause, stop and save or delete workout.

Note: there will be a confirmation screen before deleting a ride. Stop and save will stop the workout and save it to History.





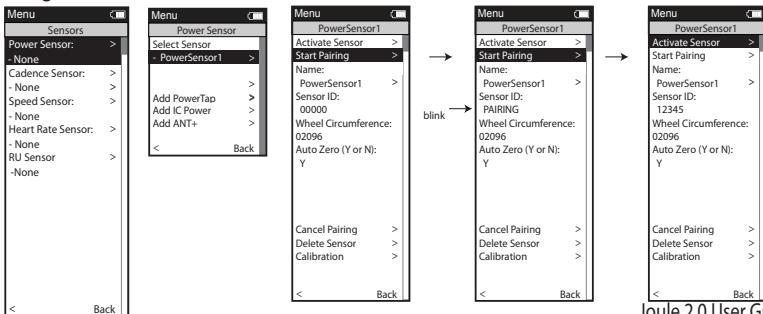
## Chapter 5: Sensors

### Setting Up Sensors

Joule™ is compatible with many ANT+ sensors, each having a unique code. A sensor is defined as ANT + compatible power meters, cadence sensors, speed sensors, heart rate straps and CycleOps resistance units. Joule™ needs to be paired to each sensor to ensure proper functionality.

1. Press the MODE button until **Menu** mode appears.
2. Select **Sensors**.
3. Select the desired sensor type (Power, Cadence, Speed, Heart Rate or RU); make sure sensor is awake and isolated from other active sensors by 65 feet/20 meters).
4. For Power sensors, select type of power meter. (PowerTap, Indoor Cycle -IC, ANT+, SRM, Quarq)
5. Select **Start Pairing**. Note: If a heart rate strap was purchased with Joule™ with it will already be paired to Joule™ .
6. After successful pairing, Joule™ should display a five digit code corresponding to the sensor. (Pairing may take up to 60 seconds).
7. Select **Name and/or Wheel Circumference** to edit if desired.
8. Select **Active Sensor** to save as the primary sensor and return to sensor list.
9. Only activate sensors will be found by Joule™.

Follow above steps for Setting Up any Power, Cadence, Speed, Heart Rate or Resistance Unit sensor. Note: It is recommended the Auto Zero setting for PowerTap remain selected as yes, unless using a track hub.



## Chapter 5: Sensors

### Calibrating Sensors

For accurate PowerTap and indoor cycle readings, it is important to frequently zero the torque. If the current power display is positive or negative while coasting the torque must be zeroed. This operation must be done while stopped with no tension on the chain, pedals and the the transmission icon must be illuminated. For calibration of other power sensor please refer to that sensor manufacturer's calibration recommendations.

1. Press the MODE button until **Menu** mode appears.
2. Select **RU Sensor**
3. Select **Calibration**
4. After successful pairing, Joule™ should display a five digit code corresponding to the sensor. (Pairing may take up to 60 seconds).
5. Select **Roll Down, Manual or Restore to Default** to calibrate resistance unit.
6. Select **Back** to access the Menu.

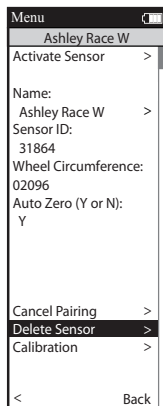
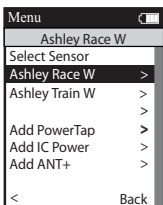
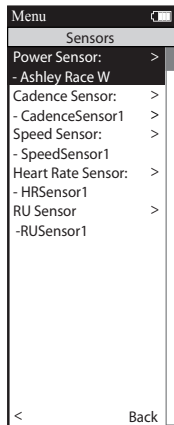


## Chapter 5: Sensors

### Deleting Sensors

Deleting sensors when not in use will help to optimize Joule™ efficiency.

1. Press the MODE button until **Menu** mode appears.
2. Select **Sensors**
3. Select **Sensor** (Example: Ashley Race W).
4. Select **Delete Sensor**
5. Select **Yes** to confirm. Note: If deleting an active sensor a new sensor must be selected.

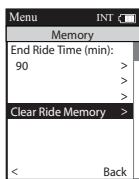
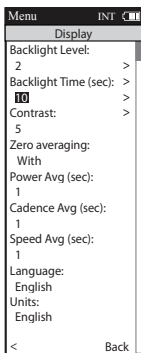
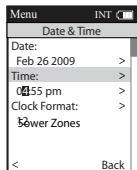


## Chapter 6: Setting Up Joule™

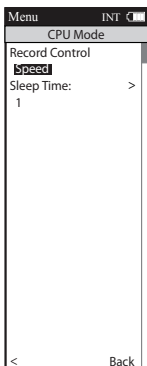
### Setting Up Joule™

Setting up Joule™ will allow for editing Date and Time, Backlight, Power/Speed/Cadence Smoothing with Zeros, Memory, End Ride Time, Record Control, Sleep Time, Firmware Version, Odometer and Test Mode.

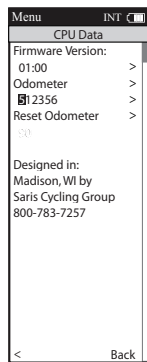
1. Press the MODE button until **Menu** mode appears.
2. Select **Setup Joule™**
3. Select **Date and Time, Display, Memory, Joule™ Mode, Joule™ Data, or Test Mode** to edit desired computer setting.
4. Select **Back** to access the Menu.



Note: End ride time controls when the current ride automatically is saved to History and Reports.



Note: Record control sets how Joule™ manages recording of data. Speed setting starts recording when speed is present. Heart rate setting starts recording any time heart is present.



Note: Power smoothing adjusts the rate at which the displayed metric updates. 1=fastest, 30=slowest. Note: End ride time controls how long Joule waits after no speed is measured before the current ride is automatically saved to History and Reports.

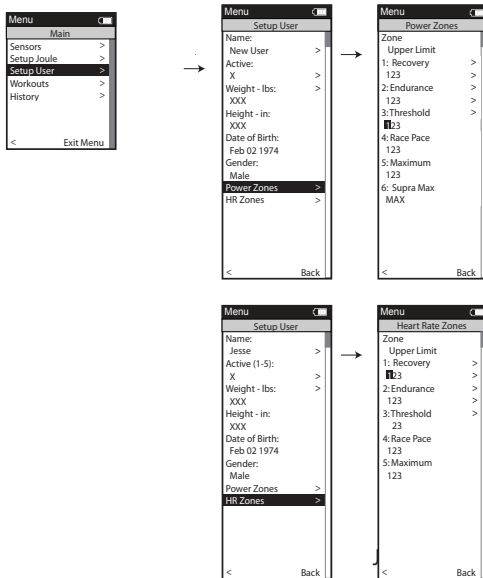
## Chapter 7: Setting Up User

### Setting Up User Profile

Setting up a user profile is important for Joule™ to display the most accurate information.

1. Press the MODE button until **Menu** mode appears.
2. Select **Setup User**
3. Enter **Name, Active, Weight Pounds, Height Inches, Date of Birth, Gender, Power Zones and Heart Rate Zones.** using the joystick to switch letter or number value.
4. Select **Back** to access the Menu.

Note: TSS calculations use the upper values of the threshold zone.

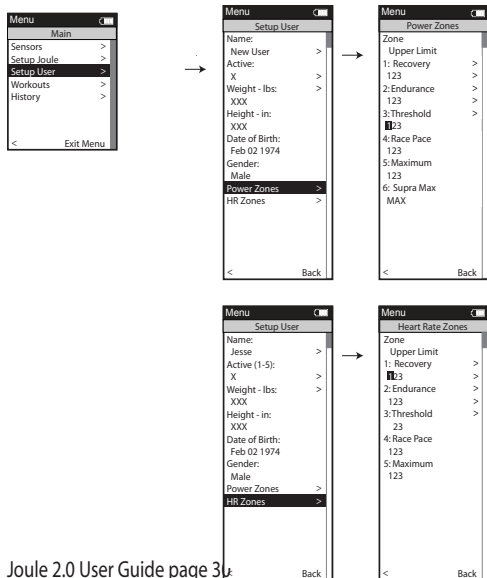


## Chapter 7: Setting Up User

### Editing User Profile

Edit user profile to reflect changes to weight, power zones, heart rate zones and to ensure the most accurate information.

1. Press the **MODE** button until **Menu** mode appears.
2. Select **Setup User**
3. Edit **Name, Active, Weight Pounds, Height Inches, Date of Birth, Gender, Power Zones and Heart Rate Zones** using the joystick to switch letter or number value.
4. Select **Back** to access the Menu.



## Chapter 8: History

### Previous Rides

History mode allows for comparing a previously ridden ride against averages. History contains three views: previous rides, max and totals.



1. Press MODE button to navigate to Menu.

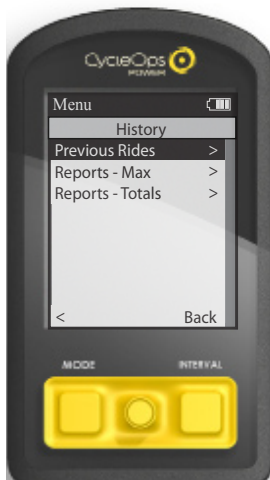
2. Move joystick to up/down to History.

3. Move joystick to up/down to previous rides.

4. Previous rides view is selecting a destined ride date to compare against two week, four week, eight week, six month and twelve month averages. Note: the two week through twelve month average does not include the selected ride.

Max view is the max values achieved for each report metric over the average on two week, four week, etc.

Total view is the total values achieved for each report metric over the average on two week, four week, etc.



## Chapter 8: History

### Viewing History

Access all reports in History mode.

History			History			History			History			History			History			History		
Summary			Power Detail			Work			Peak Power			Time in Power Zones			Time in HR Zones			Climbing		
MAX	ZWR	MEAN	MAX	ZWR	MEAN	ZWR	TWR	MEAN	MAX	ZWR	MEAN	MAX	ZWR	MEAN	MAX	ZWR	MEAN	MAX	ZWR	MEAN
RIDE TIME	99:59:59	99:59:59	AV WATTS	9999	9999	KJ	9999	9999	5 SEC	2999	2999	1	99:59:59	99:59:59	ET GAIN	9999	9999			
MILES	9999	9999	MX WATTS	9999	9999	KJHR	9999	9999	30 SEC	2999	2999	2	99:59:59	99:59:59	AV GRACE	100%	100%			
KJ	9999	9999	ZERO WATTS	99:59:59	99:59:59	KJ ROLL	9999	9999	1 MIN	2999	2999	3	99:59:59	99:59:59	ET LOST	9999	9999			
AV WATTS	9999	9999	ZERO WATTS	100%	100%	KJ ZID	9999	9999	5 MIN	2999	2999	4	99:59:59	99:59:59	WIM	9999	9999			
AV CAD	250	250	NP	2999	2999	CAL	9999	9999	20 MIN	2999	2999	5	99:59:59	99:59:59						
AV MPH	99	99	AV WING	2999	2999	TSS	500	500	30 MIN	2999	2999	6	99:59:59	99:59:59	1	100%	100%			
AV HR	240	240	MX WING	2999	2999	IF	250	250	40 MIN	2999	2999	1	100%	100%	2	100%	100%			
									60 MIN	2999	2999	2	100%	100%	3	100%	100%			
												3	100%	100%	4	100%	100%			
												4	100%	100%	5	100%	100%			
												5	100%	100%						
												6	100%	100%						



## Chapter 9: Troubleshooting Joule™

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### No display on computer screen

- Computer is asleep – Press MODE or INTERVAL on the computer to wake up the computer.
- Computer is too cold- operating temp. is 32 to 110 degrees Fahrenheit

### Computer display is on, but there is no transmission of data.

- Hub is asleep - spin the wheel to wake up the hub.
- Computer has not “found” the hub. Press and hold MODE and INTERVAL button until “Find” appears on Title Bar. Make sure hub is awake by rotating wheel once.
- Batteries need replacement - replace the hub batteries as shown in the maintenance section of the User Guide

### Power seems incorrect

- Torque value is not zeroed. To manually zero torque, go to Menu, Sensors, Select Sensor, Calibration. Manual Zero the hub. Torque is now being displayed.

If re-zeroing the torque does not recalibrate the unit, call Saris Cycling Group customer service at 1-800-783-7257.

### Speed seems incorrect

- Wheel size incorrect -refer to Sensors to enter the correct size in corresponding sensor.

## Chapter 10: Important Precautions

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5253 Verona Road

Madison WI 53711 USA

Telephone: 800.783.7257 or 608.274.6550

Fax: 608.274.1702

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### Modifications

Saris Cycling Group, Inc reserves the right to make improvements and/or updates to the products described herein at any time without notice.

### FCC Statement of Compliance:

Statement of Compliance for FCC and Industry Canada:

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

The term "IC:" before the radio certification number only signifies that Industry Canada technical specifications were met.

Changes or modifications to this device not expressly approved by the party responsible for compliance with FCC regulations (the manufacturer) could void the user's authority to operate the equipment.

## Chapter 10: Important Precautions

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NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING: Always consult a physician before beginning or modifying any exercise program.

### Precautions:

- Keep eyes on the road. Do not become overly engaged with CycleOps Joule™ 2.0 display.
- We recommend getting familiar with the computer functions while stationary.
- The computer and chest strap are water resistant, not water proof. Avoid sustained water contact and do not deliberately place CycleOps Joule™ 2.0 or its components in water or under high-pressure sprays.
- Avoid spraying the unit directly with solvent mixture. Do not use thinner or other solvents to clean parts.
- Failure to adhere to these precautions may cause premature failure or incorrect operation of the unit and may void the warranty.

## Chapter 10: Important Precautions

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### Battery Warnings:

- Charge battery at temperature range of 0-45 degrees Celcius. engaged with CycleOps Joule™ 2.0 display.
- Do not immerse the battery in water or seawater, and keep the battery in a cool dry environment during stands by period. functions while stationary.
- Do not connect the battery to an electrical outlet.
- Do not strike or throw the battery against hard surfaces.
- Do not transportor store the battery together with metal objects such as necklaces, hairpins, etc.
- Do not heat or dispose in fire or water. Do not modify or disassembly the battery. It will be dangerous and may cause ignition, heating leakage or explosion.
- Do not short-circuit positive (+) and negative (-) teminals. Keep away from metal or other conductive materials. Jumbling the batteries of direct contact with positive (+) and negative (-) terminals or other conductive materials may cause short-circuit.
- Do not reverse the positive (+) and negative (-) terminals.
- Do not solder the battery directly. Excessive heating may cause deformation of the battery components such as the gasket, which may lead to the battery swelling, leakage, explosion or ignition.
- Do not use abnormal cell which has damages by shipping stress, drop short or something else, and which gives off electrolyte odor.
- Do not use battery in a location where static electricity is rich, otherwise, the safety devices may be damaged, causing a harmful situation.
- If the battery gives off an oder, generates heat or becomes discolored, or in any way appears abnormal during use, recharging or storage, immediately remove it from the device or battery charger and stop using it.
- Do not use sharp things to hit the battery.

### USB STICK

[Information to go here.](#)



Image Here

## Chapter 11: Technical Specifications for Joule™

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Interval Data Storage	Unlimited
Interval Display	Unlimited
Operational Temperature	0 to 45 degrees Celsius or 32 to 108 Fahrenheit
Battery Life	20 hours approx.
Battery Type	Rechargeable
Range of Measurement:	
Accuracy	+/-1.5%
Signal Transmission	2.4 Ghz
Power	0-1999 Watts
Torque	0-1999 inch-lbs.
Speed	2-59 mph (3-95 KPH)
Distance	0.00 to 9999.99 (Miles)
Trip Time	0.00.00-999.99 Minutes
Cadence	40-240 RPM
Total energy	0-99999 KiloJoule™s
Odometer	0-99999 Miles or Kilometers
Heart Rate	0-255 BPM (Beats per Minute)

## Chapter 12: Joule™ Warranty

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CycleOps Joule™ is warranted to the original retail purchaser to be free from defects in materials and workmanship. Warranty coverage is valid to the original purchaser only and proof of purchase will be required.

Electronics - 1 year

This warranty does not cover:

1. Normal wear and tear.
2. Any damage, failure or loss caused by accident, misuse, neglect, abuse, improper assembly, improper maintenance, or failure to follow instructions or warnings in User Guide .
3. Use of products in a manner or environment for which they were not designed.

Limitations

The foregoing warranties are in lieu of and exclude all other warranties not expressly set forth herein, whether expressed or implied by operation of law or otherwise, including, but not limited to, warranties of merchantability or fitness for a particular purpose. Saris Cycling Group shall in no event be liable for incidental or consequential losses, damages or expenses in connection with its exercise products. Saris Cycling Group's liability hereunder is expressly limited to the replacement of goods not complying with this warranty or, at Saris Cycling Group election, to the repayment of an amount of the purchase price of the exercise product in question. Some states do not permit the exclusion or limitation of implied warranties or incidental or consequential damages, so the preceding limitations and exclusions may not apply to.

Procedures

Warranty service will be performed by Saris Cycling Group or an authorized Saris Cycling Group Dealer. The original purchaser must provide proof of purchase. Service calls and/or transportation to and from the Authorized Saris Cycling Group Dealer are the responsibility of the purchaser.

## Chapter 13: Definition of Terms

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### Watts

1. The basic unit of power equal to 1 joule per second. 2. 1 joule of energy release in 1 second. 3. A common unit used to express effort or intensity amongst professional cyclists.

### Watts per Kilogram of body weight (W/KG)

1. Calculation of watts generated divided by the weight of a cyclist and their bicycle. 2. Normalization intended to provide a comparison between cyclists of differing body weights.

### Training Zones

1. Discrete bins or intervals specific to a particular energy or physiological system. From short maximal efforts to long maximal efforts these energy systems run along a continuum from anaerobic to aerobic metabolic pathways. Common reference points for this continuum include the power at lactate threshold and power at VO<sub>2</sub> max.

### Zero Watts

1. Time on the bicycle when the athlete is not pedaling or transferring any measurable power output to the pedals or rear hub. For the team captain or leader, accumulating a high percentage of time at zero watts can be extremely important to their ability to conserve energy and maintain reserves for a strong finish.

### Recovery Zone

1. An easy exercise intensity where there is minimal stress or strain on the body. 2. On a 1 to 10 rating of perceived exertion scale, the recovery zone corresponds to a 1 to 2 or "really easy" to "easy". 3. On a 6 to 20 rating of perceived exertion scale, the recovery zone corresponds to a 6 to 10 or "very very light" to "very light." 4. An exercise intensity dependent solely on aerobic metabolism of primarily fat. 5. An exercise intensity that can be held for an indefinite time frame.

### Endurance Zone

1. A moderate exercise intensity where there is some stress or strain on the body 2. On a 1 to 10 RPE scale, an intensity corresponding to 3 to 4 or "moderate" to "sort of hard". 3. On a 6 to 20 RPE scale, an intensity corresponding to a 10 to 13 or "fairly light" to "somewhat hard." 4. An exercise intensity depending on the aerobic metabolism of both fat and carbohydrate. 5. An exercise intensity that can be held as long as the athlete were supplied with an influx of carbohydrate (i.e., allowed to eat).



## Chapter 13: Definition of Terms

---

### Lactate Threshold (LT) Zone

1. A hard intensity zone marked by a sudden increase in breathing rate. 2. On a 1 to 10 RPE scale, an intensity corresponding to a 5 to 7 or “hard” to “really hard.” 3. On a 6 to 20 RPE scale, an intensity corresponding to a 13 to 16 or “somewhat hard” to “very hard.” 4. A range of exercise intensity beginning at a slight inflection or rise in the blood lactate over a resting baseline to an intensity corresponding with a blood lactate 2 to 3 mM above a resting baseline. 5. A demarcation between aerobic metabolism to a mix of anaerobic and aerobic metabolism. 6. An all out exercise intensity that can be held between 40 minutes to 2 hours depending on the availability of stored carbohydrate or glycogen within the body.

### Race Pace Zone

1. An extremely hard or all out intensity zone. 2. On a 1 to 10 RPE scale, an intensity corresponding to a 7 to 8 or “really hard” to “really really hard.” 3. On a 6 to 20 RPE scale, an intensity corresponding to a 16 to 18 or “very hard” to “very very hard.” 4. An exercise intensity dependent primarily on the aerobic and anaerobic metabolism of carbohydrate. 5. An all out exercise intensity that can be held between 10 minutes to 30 minutes.

### Max Zone

1. An all out or maximal intensity zone. 2. On a 1 to 10 RPE scale, an intensity corresponding to a 9 to 10 or “really really hard” to “maximal.” 3. On a 6 to 20 RPE scale, an intensity corresponding to an 18 to 20, or “very very hard” to “maximal.” 4. An exercise intensity that elicits the causes the body to reach its maximal capacity to consume oxygen (i.e., an exercise intensity that elicits VO<sub>2</sub> max). 5. An all out or maximal effort that can be held between 2 to 8 minutes or an average of 4 minutes.

### Supra-Max Zone

1. A very short, all out effort that exceeds the power output associated with VO<sub>2</sub> max or a person’s max zone. 2. An exercise intensity that is almost entirely dependent on the anaerobic metabolism of stored ATP, Phosphagens, and carbohydrates. 3. An all out effort lasting 1 second to 2 minutes.

## Chapter 13: Definition of Terms

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**VO2 Max** 1. The maximal amount of oxygen that a person can consume and process measured in liters of oxygen per minute (absolute) or in milliliters of oxygen per minute per kilogram of body weight (normalized to body weight). 2. The upper limit of aerobic metabolism. 3. A strong predictor of endurance performance in a mixed population of individuals. 4. An exercise intensity corresponding with the maximal power output a person can hold between 2 to 8 minutes.

### Lactate Threshold

1. An exercise intensity where the production of lactate or appearance of lactate in the blood exceeds the removal or disappearance of lactate from the blood. 2. An exercise intensity characterized by a sudden increase in breathing rate or ventilation. 3. An exercise intensity where individuals begin to feel a burning sensation in working muscle. 4. An exercise intensity considered to be hard. 5. An exercise intensity that can be held for a prolonged period of time ranging from 40 minutes to 2 hours. 6. Amongst athletes with similar VO2 max values the power at lactate threshold is the strongest predictor of performance.

### Lactate Threshold Break Point

1. The power output or exercise intensity where blood lactate just begins to increase above its resting baseline. 2. An exercise intensity characterized as somewhat hard. 3. The upper end of the endurance training zone and the bottom end of the lactate threshold zone. 4. An exercise intensity that can be held for 1 to 3 hours or as long as there is available stored carbohydrate or glycogen.

### Lactate Threshold > 1 mM

1. The power output or exercise intensity where the blood lactate is equal to 1 mM above its resting baseline. 2. An exercise intensity characterized as hard. 3. The mid point of the lactate threshold training zone. 4. An exercise intensity that can be held for 1 to 2 hours.

### Lactate Threshold 4 mM

1. The power output or exercise intensity at a blood lactate level of 4 mM or 2 to 3 mM above baseline. 2. An exercise intensity characterized as very hard. 3. The upper limit of the lactate threshold zone. 4. An exercise intensity that can be held for 30 minutes to 1 hour.

## Chapter 13: Definition of Terms

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### Peak Sustainable Power or Peak Power

1. The highest average power output that can be held for a given duration. 2. For most individuals a peak sustainable power or peak power output lasting 4 to 8 minutes is equivalent to an intensity that elicits their VO<sub>2</sub> max, or maximal capacity to consume oxygen. 3. For most individuals a peak sustainable power output lasting 20 to 40 minutes is equivalent to an intensity that elicits their lactate threshold or a value of blood lactate 2 to 3 mM above their baseline blood lactate. 4. For most individuals a peak sustainable power output lasting 40 minutes to 2 hours is equivalent to an intensity that elicits their lactate threshold, or a value of blood lactate just above to 1 mM above their baseline blood lactate. 5. In cycling, the peak sustainable power for any given duration is analogous to their best performance for a given time. For example, a runner might have a personal best of 5 minutes in a mile run and 35 minutes in a 10 km run, whereas a cyclist might have a personal best or peak sustainable power of 400 watts for 5 minutes and 340 watts for 35 minutes.

### Normalized Power

1. An estimate of the power that you could have maintained for the same physiological “cost” if your power output had been perfectly constant.

Intensity Factor (IF) 1. Ratio of normalized power to power output at threshold. 2. A convenient way of comparing the relative intensity of a training session or race either within or between riders, taking into account changes or differences in threshold power. Typical IF values for various training sessions or races are as follows:

- Less than 0.75 recovery rides
- 0.75-0.85 endurance-paced training rides
- 0.85-0.95 tempo rides, aerobic and anaerobic interval workouts (work and rest periods combined), longer (>2.5 h) road races
- 0.95-1.05 lactate threshold intervals (work period only), shorter (<2.5 h) road races, criteriums, circuit races, longer (e.g., 40 km) TTs
- 1.05-1.15 shorter (e.g., 15 km) TTs, track points race
- Greater than 1.15 prologue TT, track pursuit, track miss-and-out

## Chapter 13: Definition of Terms

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**Training Stress Score (TSS)** 1. Modeled after Dr. Eric Bannister's heart rate-based training impulse (TRIMPS), takes into account both the intensity (i.e., IF) and the duration of each training session.

The following scale can be used as an approximate guide:

- Less than 150 - low (recovery generally complete by following day)
- 150-300 - medium (some residual fatigue may be present the next day, but gone by 2nd day)
- 300-450 - high (some residual fatigue may be present even after 2 days)
- Greater than 450 - very high (residual fatigue lasting several days likely)

**Kilojoule or Kjoule**

1. 1000 Joules. 2. A unit of energy equal to the work done by a force of 1000 newtons acting through a distance of 1 meter. 3. A measure of mechanical energy or the energy released when a force is applied to an object or body. 4. A common unit used to express the total volume or work accomplished during a given workout, ride, or exercise bout. 5. A unit or measure used to express the total training load. 6. The average power output in watts multiplied by the time in seconds divided by 1000.

**Calorie**

1. A unit of energy equal to that needed to raise the temperature of 1 gram or ml of water 1 °C. 2. A measure of thermal energy or the energy released when a fuel or substrate is burned.

**Kilocalorie or Kcal**

1. 1000 calories. 2. A unit of energy equal to that needed to raise the temperature of 1 kilogram or liter of water 1 °C. 3. A measure of the amount of energy in food 4. On U.S. food labels, 1 Calorie, spelled with a capital "C", rather than a lower case "c" is equal to 1 Kilocalorie or Kcal. 5. 4.186 Kjoules 6. For a given person, the total energy burned in Kcals is equal to the total Kjoules of work performed on a bicycle divided by 4.186 divided by the percent fraction (i.e., 22% = 0.22) of that person's gross mechanical efficiency. 7. 1 to 1.2 multiplied by the total Kjoules.

**Cadence**

1. The number of pedal revolutions per minute.

## Chapter 13: Definition of Terms

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### Heart Rate

1. The number of time the heart beats each minute or beats per minute or BPM. 2. Although the heart rate response is reflective of the cardiovascular strain it is by no means always indicative of the metabolic strain or external power output.

### Maximal Heart Rate

1. The highest achievable heart rate during an all out 2 minute to 8-minute effort. 2. The highest heart rate recorded during competition or training. 3. The heart rate associated with the power output at VO<sub>2</sub> max. 4. Commonly estimated as  $220 - \text{Age}$ . 5. Better estimated as  $208 - (0.7 \times \text{Age})$ .

### Velocity

1. The distance traveled in a given time frame normally expressed in meters per second, kilometers per hour, or miles per hour. 2. Speed. 3. Power divided by the total resistance impeding movement. 4. A function of a cyclist's power output and all of the forces resisting that cyclist's forward motion.

### Rate of Ascent

1. The vertical speed traveled or climbed in feet per hour or meters per hour. 2. The VAM or vertical ascent in meters per hour. 3. A reflection of a cyclist's power output on climbs steeper than 7% in grade. At an 8% grade, a rate of ascent of 1800 meters per hour requires a power output of 6.3 watts per kg and is considered the upper limit for climbing speed in professional cyclists.

## Chapter 13: Definition of Terms

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### Elevation Gain or Rise

1. The total vertical distance in feet or meters traveled or climbed over a given distance ridden.

### Percent Grade

1. A measure of the steepness of a climb where a 100% grade or 45-degree road angle is equal to a 1-meter vertical increase in elevation (rise) for each 1-meter traveled horizontally (run).
2. The rise or vertical increase in elevation divided by the run or horizontal distance traveled multiplied by 100 ( $\text{rise} \div \text{run} \times 100$ ).
3.  $100 \times \text{Tangent (slope)}$ .
4. The elevation gain divided by the square root of the actual distance traveled squared minus the elevation gain squared ( $\text{Elevation Gain} / [\text{square root (Actual Distance}^2 - \text{Elevation Gain}^2)]$ )

### Shallow Grade or Hill

1. A road with a percent grade between 2 to 4%.

### Moderate Grade or Hill

1. A road with a percent grade between 4 to 6%

### Steep Grade or Hill

1. A road with a percent grade between 6 to 8%

### Wicked Steep

1. Any road, trail, path, climb or mountain greater than 8% in grade.

### Category 1 to 4 Climb

1. A rating system used to rank the difficulty of a climb that is based on a combination of the length, grade, and location of the climb on the course. A category 1 climb is considered the most difficult while a category 4 climb is considered the least difficult.

### Hors Category Climb

1. A climb that is so difficult that it is beyond categorization.
2. Any climb longer and steeper than a category 1 climb.
3. The most difficult climb in the Tour de France.

## Chapter 13: Definition of Terms

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### Ride Time

1. The total elapsed time while moving. Most calculations (averages etc.) are based on this time vs. the total elapsed time since the ride began or the time spent pedaling.

### Distance

1. The length from start to finish along ridden roads measured in meters, kilometers, or miles where 1000 meters is equal to 1 kilometer and 1 kilometer is equal to 0.62 miles.