

Contents

Introduction	Features	1
	About AutoCal.....	2
	Installing Batteries	4
	Button Logic	5
	Messages	6
Programming	ChEc Wheel Size	8
	Adjust Wheel Size	9
	LoAd Resets	11
	ChEc Resets	15
	Changing an Incorrect Number	16
	Add ing a Reset	17
	Clearing the Resets	18
	Switching to Kilometers	19
Running	Manual Adjustment	20
	Speedometer	21
	Clearing Peak Speed	21
	Count.....	22
	Shut OFF	23
Miscellaneous	More Info	25
	Cautions	26
	Instrument Troubleshooting	27
	Sensor Troubleshooting	28
	Spare Parts	29
	Warranty	30

Complete installation instructions are included with the Sensor Kit.

■ *Features*

<i>AutoCal™</i>	Monitors the wheel size factor throughout the entire race, and automatically re-calibrates when necessary to match the bike used to lay out the course.
<i>Automatic Resets</i>	Resets may be entered prior to the start of a race. As you encounter each Reset during the race, your Odo will automatically jump to the new Mileage. Approximately 28 pair (56 mileage points) may be entered into memory.
<i>Adjustable Wheel Size</i>	Wheel sizes from .1 to 99.9 inches may be entered in .1 inch increments. This allows for an accuracy of 5 feet per mile.
<i>Mileage Adjustment</i>	The displayed value may be easily adjusted to match the club's Mileage marker.
<i>Speedometer Readout</i>	You may switch back and forth between a Mileage readout and a Speed readout at any point during the run.
<i>Peak Speed</i>	The highest speed you have reached from the start is retained in memory. At any point during or after the event, you can display this speed.
<i>Metric Operation</i>	Simply by entering the wheel size in centimeters, the display will increment in Kilometer and Kilometers per hour. The range of wheel size is 1 to 999 centimeters.

About AutoCal

AutoCal measures the difference between your readout and the Mileage markers throughout the entire race, and then re-calibrates when necessary to match the bike used to layout the course. An added bonus is that it also corrects other factors, such as slippery conditions or how aggressively you scrub distance each time you use your front brake aggressively.

How does it work?

As you leave the start of each race, your **Odo** uses your Programmed Wheel Size for calibration until you make your first manual adjustment. After you complete this first adjustment, it performs a series of calculations which creates a new wheel size factor, the AutoCal Wheel Size.

AutoCal Wheel Size

It uses this new wheel size until the next manual adjustment, where it again calculates and creates a new AutoCal Wheel Size. It repeats this cycle each time you manually adjust the readout. You can view the AutoCal Wheel Size at any time during the race by momentarily holding both buttons.

Frozen Readout

Once you begin a manual adjustment by pressing either button, any distance accumulated if you are rolling is not added to the readout, but is put into memory. This frozen readout simplifies adjusting without coming to a complete stop at the marker.

Mileage readout

There are 2 ways to return to the normal Mileage readout. The first is the easiest - allow it to return on it's own after you complete the adjustment, since it automatically returns after 10 seconds of no button activity. Or you can bump BOTH buttons to instantly return to the normal Mileage readout. Either way, the readout will blink, then add the distance you may have rolled during the manual adjustment.

Accuracy

For the best accuracy, BEGIN making your manual adjustment as soon as you are alongside a Mileage marker, NOT before or after you have passed. You have plenty of time to complete the adjustment, even if you continue rolling down the trail.

About AutoCal™ (Continued)

Below are some **DO'S** and **DONT'S**, along with a warning, which will help you to enjoy the maximum benefits **AutoCal** has to offer.



BEGIN your manual adjustment as soon as you are right **ALONGSIDE** the Mileage marker.

END each manual adjustment with the **EXACT** Mileage which is on the Mileage marker, regardless of how far you may have rolled past the marker during the adjustment.

BE SURE not to allow more than 10 seconds between bumps of the buttons. Remember, the instrument automatically returns to the normal Mileage readout after 10 seconds of **NO BUTTON ACTIVITY**.



DO NOT guess at the Mileage if you become lost on the trail. Wait until you come upon a marker before you make a manual adjustment. Safeguards are built into **AutoCal's** logic which prevent false calibrations due to problems such as this.



If you **DO NOT** have Resets loaded into memory, automatic calibration will occur **ONLY** at the 2.9 marker. You may continue to make manual adjustments at the other markers, however, automatic calibration will be turned **OFF**.

Why? **AutoCal** cannot distinguish between an intentional Reset and a Mileage error unless you tell it where the Resets are by loading them into memory.

Races with no Resets

To enable automatic calibration throughout the entire race, load a false Reset with both halves the same. (90.00 to 90.00)

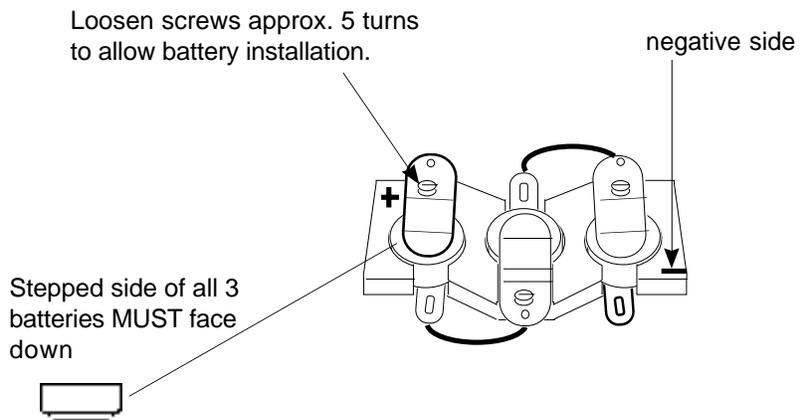
a Final Word

As precise and sophisticated as **AutoCal** is, occasionally you may run events where your readout has consistent errors in both directions. The cause is probably erratic Mileage marking by the club, a problem which no instrument can resolve.

Installing Batteries



A new chip has recently become available which ensures clean power up. Shorting is no longer necessary, but not harmful to the instrument.



- Use 357 **SILVER OXIDE** Watch/Calculator batteries
- Coat the ends of the batteries lightly with Vaseline
- Silver Oxides should provide approx. 100 hours of **ON** time
- Replace batteries when the digits of the display become too light to read

DO NOT use LOCTITE®, Silicone Seal, or Contact Cleaner on any part of the instrument.

Button Logic

The buttons on the instrument allow you to load data, and to move among it's various functions. Below is a brief summary of how the buttons work.



BUMP TOP BUTTON

Generally used to increment the value on the readout



BUMP BOTTOM BUTTON

Moves you to the next step



HOLD TOP BUTTON

Moves you to another function



HOLD BOTTOM BUTTON

Moves you to wheel size and Reset check



BUMP BOTH BUTTONS

While on the trail, used to switch between Mileage and Speed



HOLD BOTH BUTTONS

Used for Clearing data and Shutting Off

Summary

In general, if the number on the readout is what you want, bump the bottom button.

If it is not what you want, use the TOP BUTTON.

Messages

Your **Odo** will display messages at various times which will help you to move around it's many functions. There are 3 types of messages: Momentary, Static, and Special.

Momentary Messages

Momentary Messages sometimes appear while you are HOLDING one or both buttons. Think of these messages as questions:

*If the message is what you want, continue to HOLD
If it's not what you want, simply release!*



ChEc

ChEc the wheel size and Resets?



LoAd

LoAd a new group of Resets?

End?

End loading the Resets?

Add?

Add a Reset to your group of Resets?



CLr?

Clear all of the Resets?

OFF?

Shut **OFF** ?

c m?

Set wheel size to **centimeters**?

, m?

Set wheel size to **inches**?

Messages (Continued)

Static Messages

Static Messages are used to show if you have Resets in memory

The image shows the text 'CLR' in a digital, seven-segment display font, enclosed in a rectangular box.

The memory is **CLear** of Resets

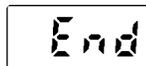
..... and to mark your position while you are loading Resets:

The image shows the text 'to' in a digital, seven-segment display font, enclosed in a rectangular box.

You are between a pair of Resets, such as 2.30 **to** 3.45

The image shows the text 'cont' in a digital, seven-segment display font, enclosed in a rectangular box.

You are just past the second half of a pair of Resets. From here you may **cont**inue to **LoAd** more Resets, or **End** Loading

The image shows the text 'End' in a digital, seven-segment display font, enclosed in a rectangular box.

You are at the **End** of the group of Resets in memory

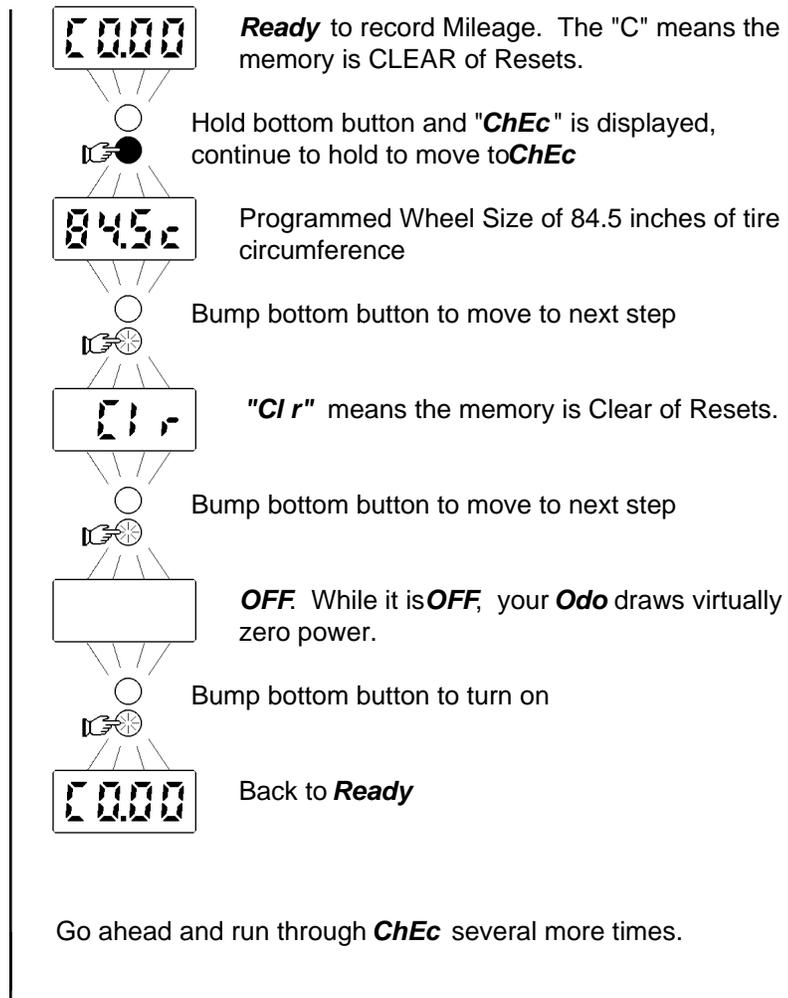
Special Message

If you have Resets loaded into memory, your **Odo** will flash this message when you turn it on. It indicates that **AutoCal** will be in effect for the entire race, not just at the 2.9 markers.

The image shows the text 'Auto' in a digital, seven-segment display font, enclosed in a rectangular box.The image shows the text 'CAL' in a digital, seven-segment display font, enclosed in a rectangular box.

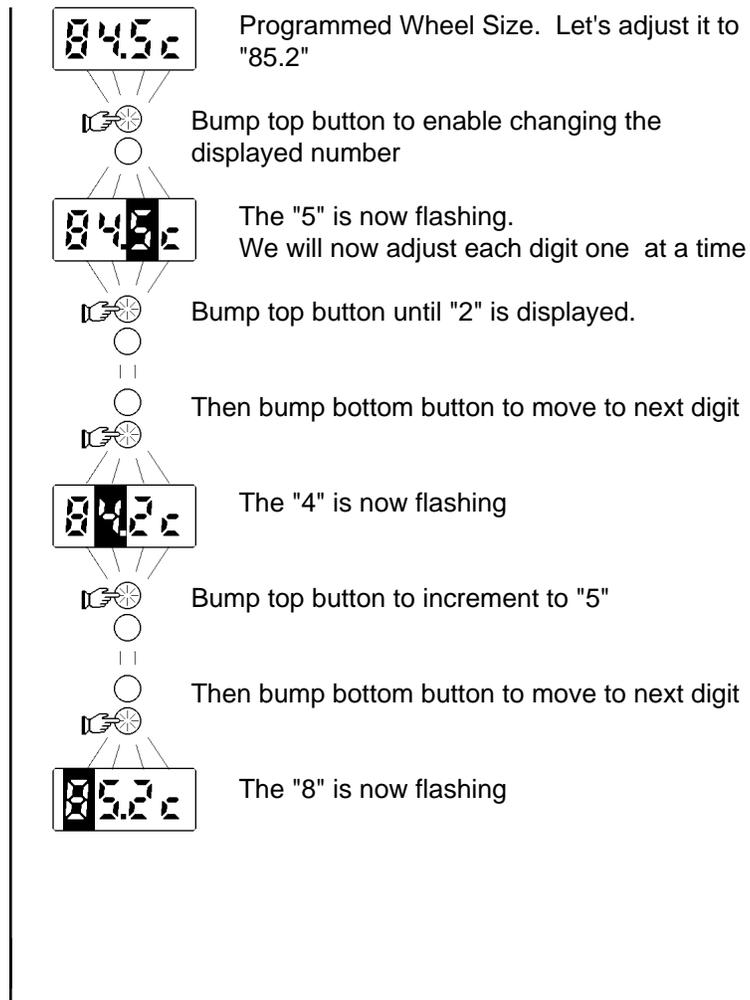
ChEc Wheel Size

Your **Odo** is ready to record Mileage the instant you turn it on. For now, let's look at the Programmed Wheel Size. The only time you can **ChEc** is while the display reads "C0.00" or "P0.00".



Adjust Wheel Size

The Programmed Wheel Size can be changed to match your tire circumference. Move to **ChEc** again and stop when the Wheel Size is displayed.



(Continued on next page)

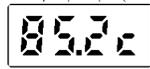
Adjust Wheel Size (Continued)



The "8" is still flashing



Bump bottom button to go to next step



No digits are flashing now

The display is steady so you may VIEW the entire number. If the number is CORRECT, bump the bottom button to enter the entire number.

If the number is INCORRECT, bump the top button to erase that number and try again. This technique is used each time you are viewing a number in **ChEc**.



"85.2" is being displayed



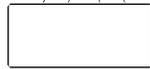
Bump the bottom button to enter "85.2" inches as the Programmed Wheel Size



The memory is Clear of Resets



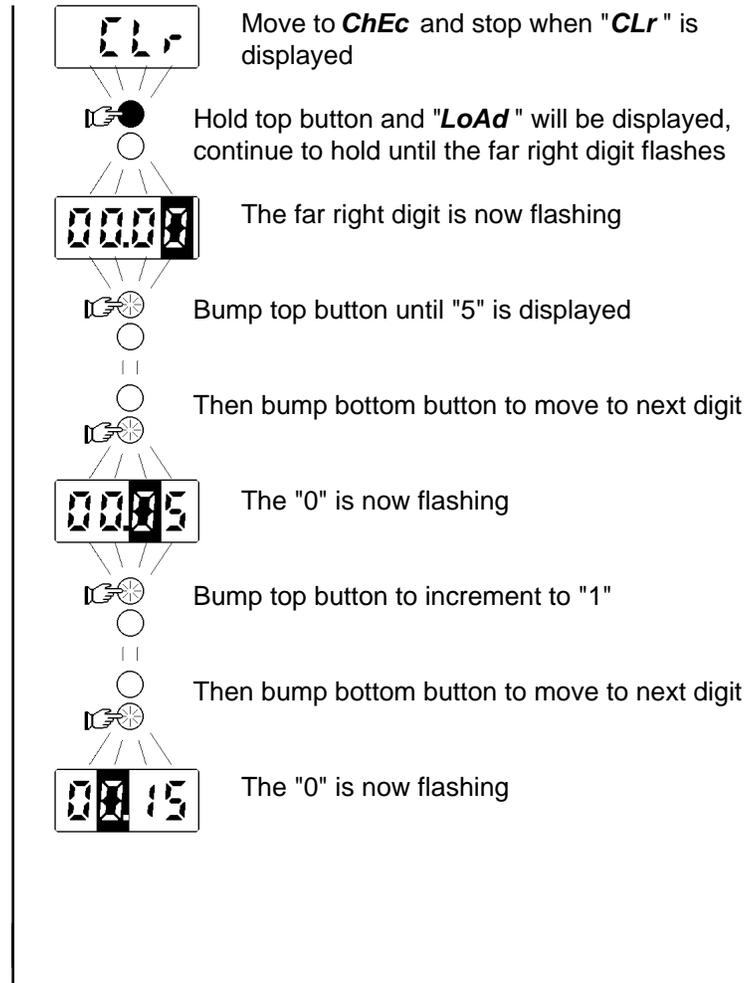
Bump bottom button to go to **OFF**



OFF

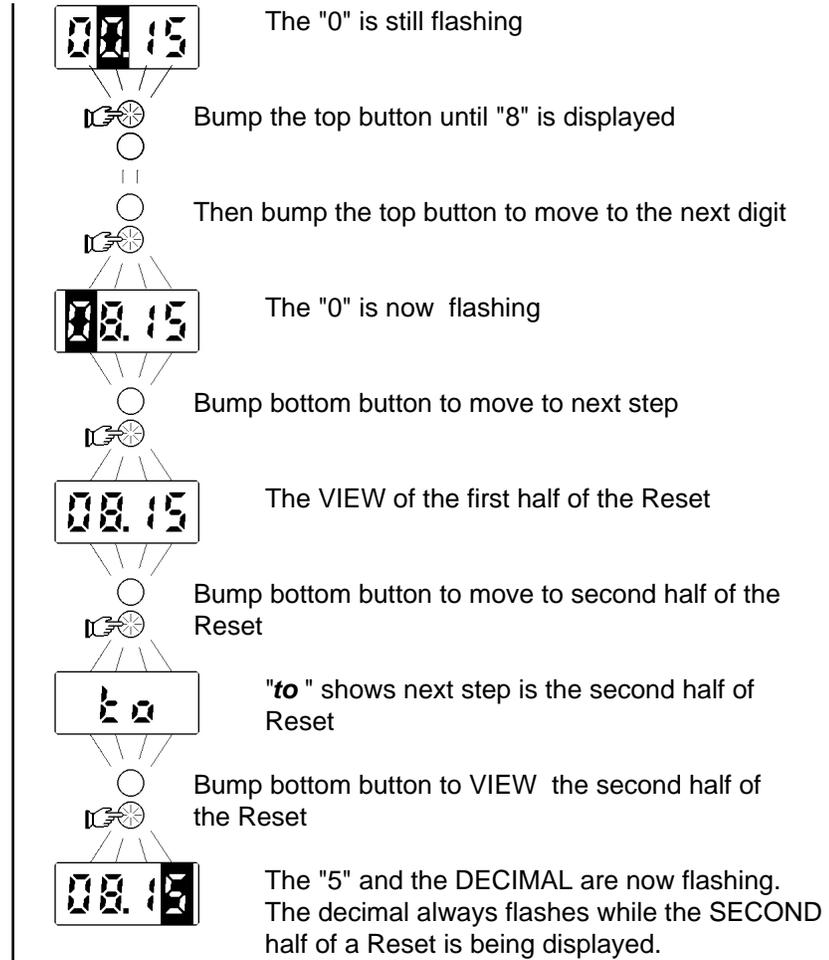
LoAd Resets

Mileage Resets are loaded prior to the start of a race by using the same technique used to adjust the wheel size. As an example, let's enter a single pair of Resets: "08.15" to "09.35"



(Continued on next page)

LoAd Resets (Continued)



(Continued on next page)

LoAd Resets (Continued)



The "5" and the decimal are still flashing



Since "5" is the correct number, bump bottom button to move to next digit



The "1" and the decimal are now flashing



Bump top button until "3" is displayed



Then bump bottom button to move to next digit



The "8" and the decimal are now flashing



Bump top button until "9" is displayed



Bump bottom button to move to next digit



The "0" and the decimal are now flashing



Bump bottom button to move to next step



The VIEW of the second Reset
Note, only the decimal is flashing now

(Continued on next page)

LoAd Resets (Continued)



The decimal is still flashing



Bump bottom button to move to next step



"*cont*" is the message being displayed

At this time you may either **continue** to load more Resets by bumping the bottom button, or you can **End** loading . For now let's end loading.



"*cont*" is displayed



Hold top button and "**End ?**" is displayed continue to hold to **END** loading



END of program



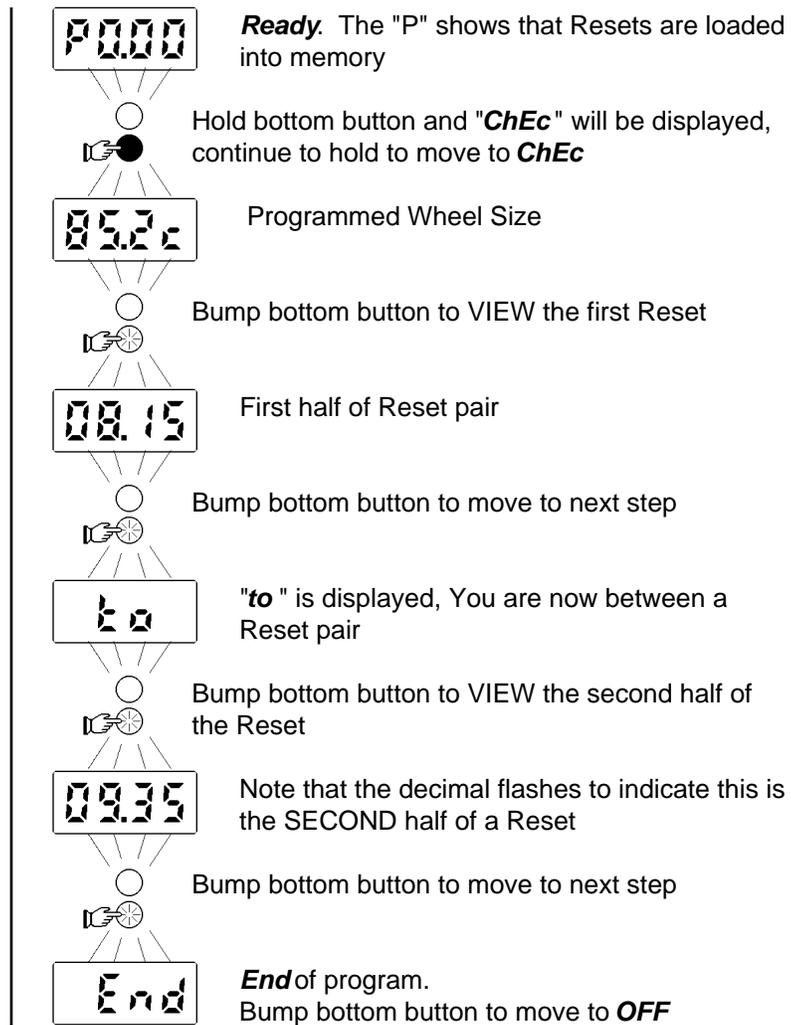
Bump Bottom button to move to **READY**



READY. The "P" shows that Resets are loaded into memory.

ChEc Resets

Any time the display is at Ready, you may **ChEc** the Programmed Wheel Size and the Resets that are in memory.



Changing a Incorrect Number

While in **ChEc**, you may change any incorrect number while it is being displayed. After changing the number, you will automatically be returned to **ChEc**. Let's change "08.15" to "08.55"



Move to **ChEc** and stop when "08.15" is displayed



Bump top button to allow changing displayed number



The "5" is now flashing.

Just follow the steps used earlier to adjust a number. Remember, any time a readout is not flashing, bump the top button to change a number.



You are now back in **ChEc**. Continue to move through **ChEc** using the bottom button.

Adding a Reset

While in **ChEc** you can also ADD a Reset pair into memory.
As an example, let's add the Reset "02.50" to "03.50"



Move to **ChEc** and stop when on "08.55" is displayed



Hold top button and "**Add ?**" will be displayed, continue to hold until the far right digit flashes



The far right digit is now flashing

Now enter "02.50" then "03.50"

A new Reset may be inserted either before or after any existing Reset. It will be placed **BEFORE** if you **Add** while the first half of a Reset is being displayed and **AFTER** if you **Add** on the second half of the existing Reset.

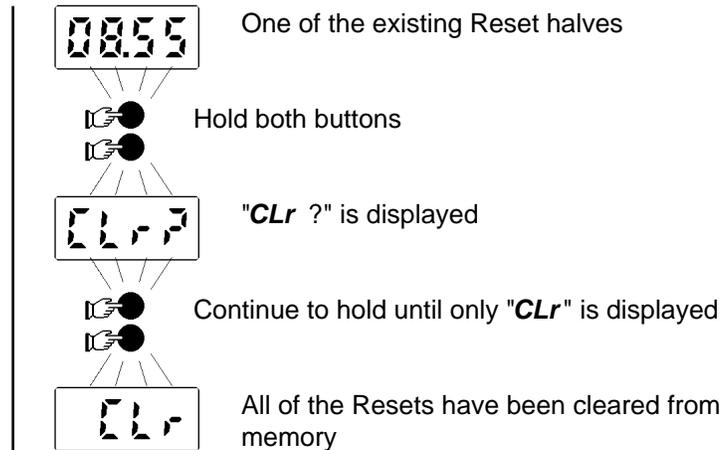


You are back in **ChEc**. Continue to move through **ChEc** using the bottom button

Step through **ChEc** again, and you'll see that the new Reset has been added.

■ *Clearing the Resets*

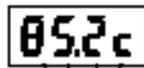
Before loading Resets for a new race, the entire group of old Resets must be cleared. Move to **ChEc** and stop at ANY of the Resets halves. You CANNOT clear the Programmed Wheel Size, so make sure a Reset half is being displayed.



You may now bump the bottom button to move to **OFF** or hold the top button to **LoAd** a new group of Resets

Switching to Kilometers

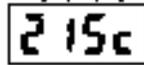
You may run an event which uses Kilometers to mark distances. By changing the Programmed Wheel Size to Centimeters, the distance will be in Kilometers and the speed in KPH. You may switch back and forth as many times as you wish.



Move to **ChEc** and stop on the Programmed Wheel Size (decimal indicates inches)

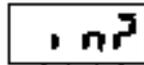


HOLD both buttons and "**cn?**" will be displayed, continue to hold to change to centimeters



Programmed Wheel size in centimeters, Note no decimal is displayed

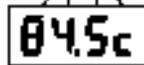
From here you may either move to the next step or switch back to inches. For now let's change back to inches.



Hold both buttons and "**in ?**" will be displayed



Continue to hold and readout will change back to inches



Wheel Size in inches (Note Decimal)

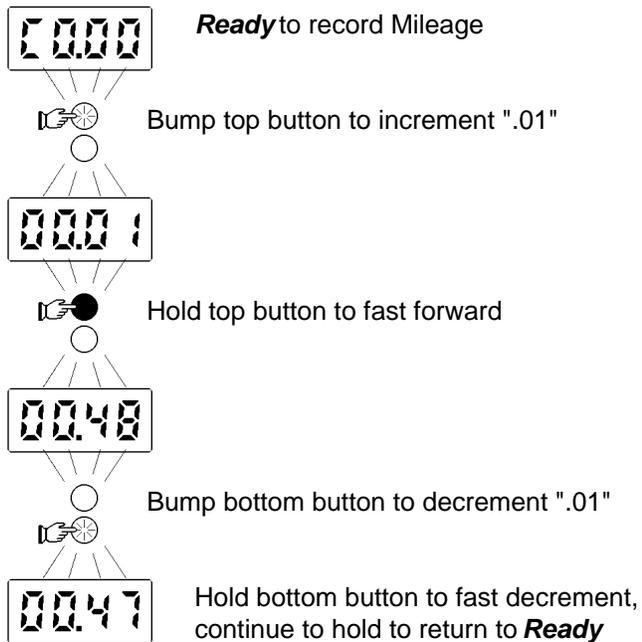


We receive calls from riders who have mistakenly switched to Centimeters for an event run in Mileage. This causes the unit to run at approximately twice the normal rate.

BE SURE TO CHECK FOR THE DECIMAL !

Manual Adjustment

The next 5 pages describe features you will use while on the trail. Let's begin with how to adjust the displayed Mileage.



There are 2 features which make adjustments easier. The increment/decrement has 2 speeds - It adjusts slowly for the first few seconds, then speeds up if you continue to hold. Also, if you fast increment/decrement into a Reset, the readout ends the adjustment at that point.



See the pages titled "**About AutoCal**" for important information on Manual Adjustments.

Speedometer



At any point in the race, you can switch to the Speed Readout



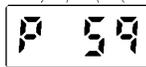
Bump both buttons to switch to Speed Readout



The current Speed is displayed



Bump bottom button for Peak Speed



The Peak you have reached since the Start of the race

From the Peak Speed readout you can either bump the bottom button to return to Speed Readout, or hold both buttons to Clear the Peak Speed.

For now, let's Clear the Peak Speed.

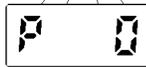
Clearing Peak Speed



Peak Speed Readout



Hold both buttons and "**Clr?**" is displayed, continue to hold to Clear Peak Speed



Peak Speed has been cleared to "0"

The Peak Speed is also automatically cleared .50 mile after the Start of each race.

Count

Proper set up of your magnet & sensor is very important for reliable performance. Two things are very critical for accurate tracking of Mileage:

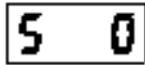
1. You must get 1, and ONLY 1, closure of the sensor for each wheel revolution. It's possible to position the magnet & sensor to get 2 or even 3 closures per revolution.
2. The sensor should stay closed for the greatest number of degrees of wheel movement possible. Rotate the wheel VERY slowly while checking.

In other words, a good, solid SINGLE closure.

The Count readout has 2 useful functions for testing your setup:

- It will count the number of times your sensor has closed.
- A tick comes on while the sensor is being held in a closed position.

How to get to Count



Go to the current speed readout.



Hold top button while the Message **cnt** scrolls across the display.



The Count readout. If you wanted to get out of Count you would bump the Main button.

Using a needle nose pliers or a short piece of wire, short across the 2 connectors on the wire pair coming from your instrument head.



Note how the value increments each time you short the wires, plus how the tick stays on for the entire time you keep the wires shorted.

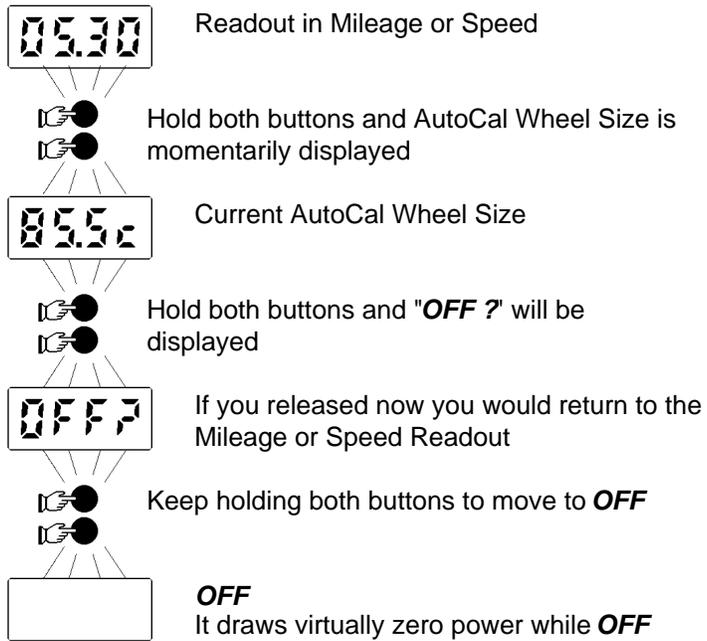
Sensor closed



After you install your magnet & sensor BE SURE to check for a good, solid **SINGLE closure**.

Shut OFF

After each use, shut off your **Odo** to preserve battery life. Since AutoCal Wheel Size is displayed prior to shutoff, you can view the current Wheel Size at any time during a race. (See "**about AutoCal**" for more information.)



All Resets and Peak Speed are still in memory. Operation will begin at C0.00 or P0.00 when your **Odo** is turned on.

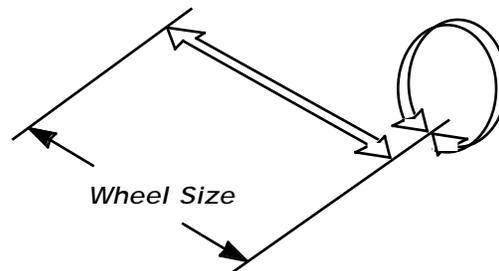


The 30 minute Automatic Shutdown feature found in previous versions of our Odometer has been removed. You must manually shut **OFF**.

More Info

Wheel Size

This is best measured by placing matching reference marks, one on your tire and another on a suitable flat surface such as a concrete slab. Roll the bike one wheel revolution *WITHOUT* the rider aboard, make a second mark on the floor, then measure the distance between marks.



Changing the wheel size

Changing the wheel size 1.0 INCH will affect the Mileage Readout approximately a .10 of a mile per 10.0 miles. If you want your odometer to run "faster", enter a LARGER wheel size. To "slow" it down, enter a SMALLER wheel size.

RESETS

MUST be entered in the SAME order that they will be encountered along the course.

Display

The display flashes for 30 seconds each time a Reset is made. This acts as a warning that you may be HOT.

(Continued on next page)

More Info (Continued)

Multiple Loops

Many races use several loops, all of which start at mile 0.0. The Resets for all loops may be loaded before the start of the race.

For your **Odo** to automatically start each loop with mile 0.0, **LoAd**a Reset back to 0.0 as the last Reset for each loop.

In some cases, the Mileage to the end of a loop may not be posted by the club. You will have to calculate this Mileage before loading your program.

TO CALCULATE:

- Determine the number of minutes for the last section of the loop.
- Calculate the distance traveled for each minute at the speed average of that section. For this, divide the speed by 60.
- Multiply the minutes by the distance traveled each minute.
- Add this to the Mileage at the START of the last section.

EXAMPLE:

The last section STARTS at 41.3 and runs at 24 mph for 31 minutes.

- 31 minutes long
- .4 miles per minute ($24 \div 60 = .4$)
- 12.4 miles long ($31 \text{ minutes} \times .4 = 12.4$)
- 53.7 is the END of the last section ($41.3 + 12.4 = 53.7$)

For our example, you would **LoAd**a Reset "53.70" to "00.00", then continue by loading the Resets for the next loop.

■ Cautions



ALWAYS Reset your instrument after installing batteries!
See "**Battery Installation**" page for instructions.



DO NOT use LOCTITE®, Silicone Seal, or Contact Cleaner on any part of your instrument head

Ignition Interference

The high energy ignition systems on today's motorcycles emit noise which, in rare cases, may interfere with the operation of your instrument. (Static heard on radios is an example of such noise). Although many safeguards have been built into your instrument to shield out this interference, take the following steps to minimize the possibility of any such problems:

- Keep throttle cable, clutch cable, and kill switch wire as far away from the instrument as possible.
- Take special care not to route these cables above the display window of the instrument.
- Remove the gas tank and make sure that throttle and clutch cables are not routed directly against the spark plug wire or ignition coil.

100 miles between Resets?

Races with two CONSECUTIVE Resets which are greater than 100 miles apart (this is rare) are handled by loading a false Reset between them.

- EXAMPLE: One Reset starts at 10.2 miles, the NEXT one starts at 123.4 miles. The instrument would make it's first Reset at 10.2, the next one at 23.4, NOT 123.4
- SOLUTION: **LoAd** a false Reset, 99.00 to 99.01, between the two pair of Resets. The Resets would be then made in the desired order, 10.2, 99.0, 123.4

Instrument Troubleshooting

If your readout goes blank while riding, or the instrument does not respond to the buttons, perform the checks below.

Reset Instrument

- Perform the instrument reset procedure.
(Refer to "**Battery Installation**" page of manual)

Readout still blank?..... Go to next check

Voltage check

- Position test leads at the same points on the battery holder used to reset instrument

Voltage below 4.1?.....

- **Replace batteries with fresh SILVER OXIDE**
- **Then Reset instrument**

Operation check

- Increment and decrement the Mileage readout, then move to **ChEc.**

Everything O.K.?..... Instrument Head O.K.

Be aware that problems which occur ONLY while your engine is running are probably caused by interference from the bike's ignition system. Be sure to read the "**Cautions**" page of this manual.

■ *Sensor Troubleshooting*

If your Mileage accumulates too slowly, too rapidly, or fails to register at all, perform the checks below. Keep in mind that a break in the wiring does not ALWAYS cause the **Odo** to quit registering Mileage altogether. The broken wire may be making intermittent contact, resulting in a PARTIAL accumulation of Mileage.

<i>Head Wire check</i>	<ul style="list-style-type: none">• Switch to count readout for Tests 1- 4• Disconnect both sensor wires from head wires• Short head wire connectors together using a short piece of wire <p><i>Readout counts Speed?.....</i> Go to next check</p>
<i>Setup checks</i>	<ul style="list-style-type: none">• Magnet-to-sensor gap 3/32" to 3/16" (2.5mm to 5mm)• Magnet slot 45 degrees to sensor body• Magnet passes over sensor body <p><i>Everything OK.?</i> Go to next check</p>
<i>Connector check</i>	<ul style="list-style-type: none">• Reconnect head wires to sensor wires• Stop wheel with magnet directly over sensor• Rap connectors sharply with your finger nail <p><i>Readout counts?.....</i> Poor connection</p>
<i>Broken wire check</i>	<ul style="list-style-type: none">• Shake sensor wires along their entire length with the magnet still over sensor <p><i>Readout counts?.....</i> Broken wires</p>
<i>Pickup check</i>	<ul style="list-style-type: none">• Switch to Mileage readout• Rotate wheel very SLOWLY <p><i>Readout increments more than .01 each revolution?</i></p> <ul style="list-style-type: none">• Rotate magnet slot• Check that wheel size is set to inches

█ Spare Parts

<i>Sensor Kit</i>	ICO sensor Assembly with TuffShield tubing, mounting tab and mounting screws ..\$ 24.95
<i>Magnet Kit</i>	Special high strength magnet, flat mounting tab, & stainless steel mounting hardware\$10.50
<i>Fork Bracket Kit</i>	Fork bracket, magnet holder, sensor block, stainless hose clamps, and mounting hardware\$9.95
<i>Single Instrument Guard</i>	Aluminum guard to help protect your valuable electronic instruments\$54.95
<i>Crossbar Clamps</i>	Two stainless steel mounting clamps and hardware\$5.95

■ *Limited Warranty*

ICO CORPORATION warrants to the original owner that this ICO Odometer is free of defects in materials or workmanship in the Instrument head for a period of 1 year from the date of purchase, and 6 months for the sensor assembly. This warranty does not cover damage resulting from improper Installation, accident, misuse, or abuse.

In case of difficulties



Repair Info

UPS Address

Many problems can be resolved WITHOUT returning the instrument to us. Please follow these steps to assure the fastest possible solution to your difficulties

- 1st refer to the **Trouble Shooting** section of this manual
- If the problem cannot be identified using the manual, Technical Assistance is provided at the following number:

Technical Assistance (504) 882-3107

Send UPS 2nd DAY AIR (Blue Label)

Please include:

- **DATE** you need your instrument back
- **DESCRIPTION** of the problems you encountered
- **RETURN** address (P.O. Boxes are not acceptable)
- **PHONE** number (Day Time)
- **PROOF** of purchase if no warranty card was sent in
- **CREDIT CARD NUMBER** for payment

ICORacing

PO Box 1050
29370 Dinkins Drive
Bayou LaCombe, Louisiana 70445