



FITMASTER

Professional Bicyclist Sizing Instrument

Owner's Manual



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Dear Fitmaster Customer:

Thank you for choosing Fitmaster to help you offer the ultimate in rider service. The Fitmaster is designed to provide precise measurements and years of solid service.

This manual is designed to make it easy to assemble and use this instrument. While we provide guidance on the set-up, merchandising and use of the Fitmaster, there is no substitute for proper training, experience and commitment to serving the rider. With these conditions, you can significantly enhance the ability of your business to deliver quality fits to the riding community.

Thanks again and may you create many satisfied customers through this tool.

Sincerely,

The Waterford Team.

Parts List



Item	Qty	Description
1	1	Base with levelers installed
2	1	Cyclops Magneto resistance unit
3	1	Resistance unit parts bag
4	1	Mounting bolt parts bag
5	1	Rear wheel mount assembly
6	1	Rear angle plate assembly
7	1	Rear angle plate label
8	1	Bottom bracket kit
Crank assembly		
9	1	Crank hardware
10	1	Chainring
11	1	Chainring bolt kit
Wheel Assembly		
12	1	Wheel
13	1	Rim strip
14	1	Tube
15	1	Tire
16	1	Cog
17	1	Axle spacing washers
18	1	Chain
19	1	Front angle plate assembly
20	1	Front angle plate label
21	1	Seatmast slider
22	1	Seat clamp
23	1	Head tube slider
24	1	Top tube slider
25	1	Seatpost

Assembly Instructions

Step 1: Preparation

- A. Establish a roomy assembly area, close to the area to be used for fitting.
- B. Prior to assembly, you will want to acquire the appropriate tools and non-supplied parts:
- C. Proper and safe assembly requires average bicycle mechanic skills, including the ability to:
 - Install a cartridge bottom bracket.
 - Install a crank and chainrings.
 - Install a bicycle chain
 - Install a rear cog
 - Install a nutted rear wheel

Tools for Assembly and Operation

Item	Qty	Description
1	1	Allen wrench - 4mm
2	1	Allen wrench - 5mm
3	1	Allen wrench - 6mm
4	1	Allen wrench - 8mm
5	1	Allen wrench - 10mm
6	1	15mm axle wrench
7	1	Chain tool
8	1	Spanner wrench for bottom bracket installation
9	1	Angle Finder
10	1	Cleaning solution to improve label adhesion.
11	1	Grease for lubricating all threads.

Be sure to lubricate all threads before securing parts.

Step 2: Unpack Cartons.

- A. Remove all parts and check in against the parts list.
- B. Level the base using the leveling screws on each leg..



Step 3. Install the rear wheel support.

Use the 4mm allen screws from the bolts bag #4 to connect the support (#5) to the base (#1).



Step 4. Install the resistance unit.

Use the parts bag #3 to connect the unit (#2) to the base (#1). Please note that the resistance roller mounts under, not behind the wheel.

Assembly (cont'd)



Step 5. Install the rear angle plate assembly.

- A. Clean off the plate surface (#6) with the cleaning solution. Then apply the angle label (#7). This serves as a guide when setting the seat angle.
- B. Bolt the rear angle plate into place.



Step 6. Install the bottom bracket.

Use the BB kit (#8) to install into the rear angle plate assembly (#6).



Step 7. Install the crank.

- A. Install chainring (#10) to drive side crank (#9) using chainring bolts (#11).
- B. Install the crank (#9) on the BB spindle (#8) according to the manufacturer's specification.



Step 8. Install the chain.

Using the chain tool, install the chain according to the manufacturer's specifications. Tension the chain as you would with a fixed gear or single speed bike.

Assembly (cont'd)



Step 9. Install the front angle plate.

- A. Apply a light coating of grease to the bottom of the angle plate to make it easy for the plate to move back and forth on the base.
- B. Use the supplied bolts (taped to the plate) to mount the angle plate.

Step 10. Install the front angle plate label.

Clean off the plate surface with the cleaning solution. Then apply the angle label (#20). This serves as a guide when setting the head angle.



Step 11. Install the head tube and seat tube sliders and seat clamp.

- A. Install head tube and seat tube sliders (#23 and #21, respectively) to the tubes in the associated mounting plates.
- B. Install the seat clamp (#22) on the seat tube slider (#23).

Assembly (cont'd)

Step 10. Install the top tube slider assembly.

- A. Connect the top tube slider (#24) to the mounts on the seat tube slider (#23 shown at right) and the head tube slider (#21).
- B. Install the seat post (#25). Tighten using the seat clamp.



Completed Basic Fitmaster Assembly



Fitting Area Preparation

A well supplied fitting area should include the following:

- Space for the Fitmaster.
- Room to set up a bike on a wind trainer.
- A place to take the rider's body measurements.
- A place for the rider to change their clothes.
- Chairs for the fitter and guests to be comfortable during the sizing session.
- Cabinet for extra parts and tools.
- Desk and/or clipboard for recording measurements and other rider information.

Non-Supplied Parts List

You must supply general parts to be able to use the Fitmaster. These parts are readily available in every bike shop.

Item	Qty	Description
A	1	Seat
B	1	Pedals
C	1	Handlebars
D	1	Stem
E.	1	Brake Levers
F	1	Handlebar Tape

While Waterford supplies an initial crank and seatpost, you may want to equip yourself with extras to increase your level of service:

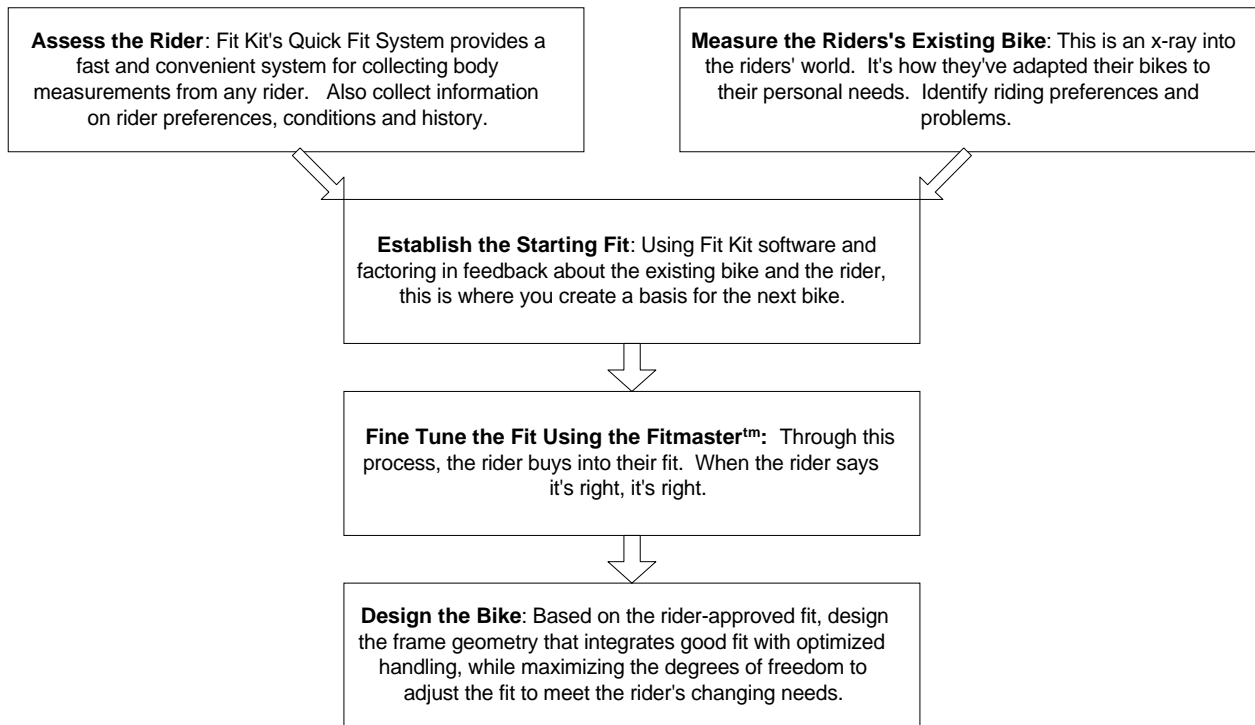
- Saddles: The Fitmaster requires a 25.4mm seatpost. You may want to purchase additional seatposts and install a range of saddles to allow comparison and quickly prepare for different riders.
- Handlebars: Consider setting up a selection of popular bar widths (40cm, 42cm and 44cm outside to outside, for example), with brake levers and bar tape, ready to match to the rider's recommended fit. Don't forget to include a flat bar set up for hybrid or off-road fitting.
- Stem: A Fit Kit FitStem lets you adjust your stem dimensions almost on the fly. This is especially useful when fitting a rider to a stock geometry. When fitting for custom geometry, having a selection of standard stems on hand let you start the rider force you to manipulate the frame dimensions to work with a normal stem, giving the rider more opportunities to adjust the stem length at a later time without affecting the bike's handling.
- Cranks: The Fitmaster is supplied with a single crank for starters. Consider purchasing a selection of crank lengths. You might also consider investing in an adjustable crank.

The proper merchandising of fitting services with a well equipped fitting area and a well-established protocol serves both you and the rider in several ways.

1. You are better able to efficiently conduct a proper fitting. You won't have to waste time looking for parts and tools. Records management is also easier.
2. The rider is more willing to place his or her confidence in you.
3. Quality control is improved since you will have more accurate information and the rider will be more willing to share honest feedback with you.
4. You can earn higher revenue than with a disorganized and/or incomplete presentation.

The Fitting Process

Though not a comprehensive guide to fitting, the following overview shows how to integrate the Fitmaster into your fitting process. Below is an overview of how Waterford conducts bicycle fitting:



Waterford strongly suggest that you adopt or develop a protocol for addressing each of the above processes. Fit Kit systems has an excellent array of tools for serving many aspects of the fitting process. They dovetail closely with the Fitmaster.

There are two general uses for the Fitmaster:

1. Fitting a rider for a custom geometry bike. In this case the framebuilder builds the bike to order.
2. Fitting a rider to a builder's stock geometry.

In both cases, a thorough assessment of the rider insures a good starting point for using the Fitmaster. In the following pages we discuss the specific procedures for each application.

Fitting For a Custom Frame

Step 1: Complete the basic rider assessment.

- A. Starting crank length (advanced).
- B. Starting handlebar width and type.
- C. Establishing the proper starting stem dimensions.
- D. Select an appropriate saddle.
- E. Compute the starting seat angle, saddle height and top tube/stem combination.

Step 2: Prepare the Fitmaster based on the starting fit:

- A. Mount the appropriate crank length and re-tighten the rear wheel. Be sure to have the proper chain tension (advanced).
- B. Mount the starting stem and handlebars based on the fit.
- C. Mount the rider's choice of saddle or (if no saddle specified), a suitable saddle.
- D. Install either the rider's pedals or pedals compatible with the rider's cycling shoes.
- E. Loosen the front angle plate bolts on the Fitmaster. This allows the front plate to float on the base as you make the other adjustments.
- F. Loosen the top tube slider.
- G. Set the seat angle based on the starting design. This means removing the bolt from the seat angle plate and placing it in the hole corresponding to the desired seat angle. Securely tighten the seat angle bolt.
- H. Set the seat tube length to the value starting value. Then set the saddle height to the starting value estimated by your initial calculations.
- I. Set the head tube angle to a value comparable to the desired frame design.

Step 3: Establish the riders leg position and pedal stroke.

- A. Determine the most appropriate saddle height. As shown in the illustrations at right, the rider's knee should be slightly bent when at the bottom of the pedal stroke. Alternatively, when the leg is fully straightened, the heel should extend about 3/4" below the pedal.



- B. Determine the most appropriate saddle setback: A good starting point is to put the rider's foot in the 3:00 position (as shown at left). Then drop a plumb bob from the front of the knee. The plumb bob should point to the center of the pedal spindle.

If you should discover the need to make a significant change to the setback, you may want to adjust the seat angle. In an ideal world, the leg extension and knee-to-pedal spindle relationship should work with the saddle in the middle of the rails.

If you need to make significant (more than 2cm) setback adjustments, you may need to recheck the seatpost height.



Custom Fitting (Cont'd).

Step 4: Establish the rider's initial top tube length.

- A. Reset the head tube height to create a horizontal top tube.
- B. With the top tube slider loose, slide the front angle plate forward until you reach the computed theoretical top tube length (also known as the effective top tube length).
- C. To the extent that you slope the top tube, subtract 2mm to the top tube length for each centimeter (or degree) of top tube slope. This is an approximation of the effect of top tube slope on the theoretical top tube. For example, if you want a 56cm theoretical top tube, with a 5 centimeter slope, the actual top tube (measured center to center will end up about 1cm shorter, or 55cm.
- D. Once you establish the starting top tube length and slope. Lock down all the sliders, the stem and bars.
- E. The rider should pedal under light to moderate resistance to warm up. Waterford recommends that the rider warm up fully - 5-10 minutes - before providing feedback on the fit.

Step 5: Get rider feedback and adjust the rider fit .

This is where the fitter's "bedside manner" is crucial. The goal is to get the most honest feedback possible from the rider and then to make adjustments accordingly. Be wary of riders who give you the answers they think you want to hear. Be especially sensitive to issues brought up during the rider inventory. **Ask, listen, observe and document.**

- A. Look for rocking of the hips from side to side or riding with the feet pointed downward. These symptoms indicate excessive leg extension.
- B. Look for excessive back movement ("hopping up and down"), this may indicate too low a saddle position.
- C. Look for comments about knee pain - another indicator of improper saddle height..
- D. Listen for comments about being cramped or over-stretched. This indicates the need for a top tube adjustment.
- E. Listen for complaints about lower back and shoulder pain. These symptoms typically indicate a position with handlebar height and reach as well as saddle angle.

The above comments just scratch the surface of possible conditions to address through the fitting process. Training and experience will provide you the tools to address a wide range of fit issues.

The key is to adjust the rider's position until he or she feels comfortable with their riding position and otherwise show reasonable form.

Step 6: Record the measurements.

Once you and the rider establish the ideal fit, it is essential to record all the pertinent statistics as a prelude to creating the custom bike. Your custom builder may have specific measurement requirements you will want to record at the end of the fitting. The following is a basic list:

- A. Saddle height from the bottom bracket.
- B. Seat tube length (center to center)
- C. Top tube length (center to center).
- D. Top tube angle (in degrees).
- E. Stem length and rise.
- F. Saddle position on the rails.
- G. Saddle height over (or under) the bars.
- H. Bar width.
- I. Crank length.

Fitting to a Stock Design

Though similar to the process of fitting a rider to a custom frame, with a stock design, the goal is to find the best stock design that fits the rider.

Step 1: Complete the basic rider assessment.

- A. Starting crank length (advanced).
- B. Starting handlebar width and type.
- C. Establishing the proper starting stem dimensions.
- D. Select an appropriate saddle.
- E. Compute the starting seat angle and saddle height.

Step 2: Prepare the Fitmaster based on the starting fit:

- A. Mount the appropriate crank and re-tighten the rear wheel. Be sure to have the proper chain tension (advanced).
- B. Mount the starting stem and handlebars based on the fit. An adjustable stem is particularly helpful.
- C. Mount the rider's choice of saddle or (if no saddle specified), a suitable saddle.
- D. Install the rider's pedals or pedals compatible with the rider's cycling shoes.
- E. Loosen the front angle plate bolts on the Fitmaster. This allows the front plate to float on the base as you make the other adjustments.
- F. Loosen the top tube slider.
- G. Set the seat angle based on catalog specifications. This means removing the bolt from the seat angle plate and placing it in the hole corresponding to the desired seat angle. Securely tighten the seat angle bolt.
- H. Set the seat tube length to the value starting value. Then set the saddle height to the starting value estimated by your initial calculations.
- I. Set the head tube angle to the catalog specifications.
- J. Set the top tube length and rise to match the target frame dimensions.

Step 3: Establish the rider's leg position and pedal stroke.

- A. Determine the most appropriate saddle height. As shown in the illustrations at right, the rider's knee should be slightly bent when at the bottom of the pedal stroke. Alternatively, when the leg is fully straighten, the heel should extend about 3/4" below the pedal.



- E. Determine the most appropriate saddle setback: A good starting point is put the rider's foot in the 3:00 position. Then drop a plumb bob from the front of the knee. The plumb bob should point to the center of the pedal spindle.

If you need to make significant (more than 2cm) setback adjustments, you may need to recheck the seatpost height.

In extreme cases, the setback may indicate the need for a different size frame.



Fitting to a Stock Design (Cont'd).

Step 4: Get rider feedback and adjust the rider fit .

This is where the fitter's "bedside manner" is crucial. The goal is to get the most honest feedback possible from the rider and then to make adjustments accordingly. Be wary of riders who provide you the answers they think you want to hear. Be especially sensitive to issues brought up during the rider inventory.

- A. Look for rocking of the hips from side to side. This indicates excessive leg extension.
- B. Look for excessive back movement ("hopping up and down"), this may indicate too low a saddle position.
- C. Look for comments about knee pain - another indicator of improper saddle height..
- D. Listen for comments about being cramped or over-stretched. This indicates the need for a stem or frame size adjustment.
- E. Listen for complaints about lower back and shoulder pain. These symptoms typically indicated a position with handlebar height and reach as well as saddle angle.

The above comments just scratch the surface of possible conditions to address through the fitting process. Only training and experience will provide you the tools to address the various issues and kinds of issues.

The key is to adjust the rider's position until he or she feels comfortable with their riding position and otherwise show reasonable form.

Step 5: Record the measurements.

Once you and the rider establish the ideal fit, it is essential to record all the pertinent statistics as a prelude to finalizing the sale. The following is a basic list:

- A. Frame size and model:
- B. Saddle height from the bottom bracket.
- C. Stem length and rise.
- D. Saddle position on the rails.
- E. Saddle height over (or under) the bars.
- F. Bar width.
- G. Crank length.



FITMASTER

Care and Maintenance

The Fitmaster is designed to give years of commercial use with a minimum of care. Below are measures that insure the proper functioning of your Fitmaster:

1. Lubricate all threads during assembly and re-assembly.
2. Keep all mechanical parts - chain, hubs, bottom bracket properly adjusted and lubricated.
3. Keep the seatpost and sliders lubricated with a light coating of lithium grease or equivalent.
4. Pivot points should be kept lubricated with a 3-in-1 oil or equivalent.
5. Periodically remove and re-grease the seatpost and any other moving parts as you would your bicycle.
6. Wipe down your Fitmaster with a damp cloth after every fit session.
7. Periodically remove the front plate and apply a light coating of grease to the underside to keep it sliding smoothly over the base.

Warranty

Waterford Precision Cycles, Inc. ("Waterford") warrants against all defects in material or workmanship for Waterford-produced parts for a period of one year from the date of purchase.

• This warranty does not cover normal wear and tear, normal maintenance items or any damage, failure or loss caused by:

1. Accident, misuse, neglect, abuse or improper maintenance.
2. Structural modifications made by anyone other than Waterford Precision Cycles.
3. Failure to follow instructions or warnings in the owner's manual.

• This Warranty is applicable to the original purchaser only.

• This Warranty does not cover separately sold products including wheel, tires, chain, seatpost, crank and bottom bracket. Please address any warranty claims to the respective manufacturer.

• Waterford will, at its option, repair or replace a defective product. Dealer labor charges are not covered by this warranty.

• Waterford is not liable for incidental or consequential damages. Repair or replacement of defective products is the sole remedy under this warranty.

• If you elect to repair a damaged or defective Waterford product through a source other than Waterford then Waterford will not be liable for the defect(s) or damage caused by such repairs.