



FREECLIMBER[®]
4200 PT, 4400 PT/CL,
AND 4600 PT/CL
OWNER'S MANUAL



StairMaster[®]
THE RESULTS YOU WANT[™]



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Corporate Headquarters

12421 Willows Road N.E., Suite 100

Kirkland, WA 98034

(800) 635-2936

(425) 823-1825

Fax (425) 823-9490

www.stairmaster.com

StairMaster



P/N 22867-A

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WARRANTY

This is to certify that the StairMaster® FreeClimber® exercise system is warranted by StairMaster Health & Fitness Products, Inc. to be free of all defects in materials and workmanship. This warranty does not apply to any defect caused by negligence, misuse, accident, alteration, improper maintenance, or an “act of God.” This warranty is non-transferable from the original owner.

If, within three years from the date of purchase, any part of the StairMaster FreeClimber exercise system should fail to operate properly (except any accessories or the battery on the 4600 CL and the 4400 CL), contact our Customer Service Department to report the problem. When calling, please be prepared to provide the customer service representative with the following information:

- Your name, customer number, shipping address, and telephone number
- The model and serial number of the inoperable machine
- The date(s) of purchase for the inoperable machine(s)
- Your billing address

This information will ensure that you are the only one ordering parts under your warranty protection. If warranty replacement parts are shipped to you, you may be required to return the inoperable parts. To facilitate this process, the following policy has been established:

- Please call our Customer Service Department to receive a Return Material Authorization (RMA) prior to shipment.
- StairMaster Health & Fitness Products, Inc. will incur all freight charges for warranty parts ordered for a machine that is less than 45 days old. The parts will be shipped to you via an overnight courier.*
- You are responsible for freight charges on warranty parts for machines that are more than 45 days old. You will not be responsible for the return shipment of the inoperable parts.
- Some inoperable warranty parts must be promptly returned to our Customer Service Department. We will pay the shipping cost for the inoperable warranty parts. Detailed instructions are included with each warranty replacement part.

StairMaster Health & Fitness Products, Inc. neither makes, assumes, nor authorizes any representative or other person to make or assume for us, any other warranty whatsoever, whether expressed or implied, in connection with the sale, service, or shipment of our products. We reserve the right to make changes and improvements in our products without incurring any obligation to similarly alter products previously purchased. In order to maintain your product warranty and to ensure the safe and efficient operation of your machine, only authorized replacement parts can be used. This warranty is void if parts other than those provided by StairMaster Health & Fitness Products, Inc. are used.

* Note: Aerosol products cannot be transported via air.

Regular use of the StairMaster® FreeClimber® exercise system is a safe and effective way to develop aerobic fitness while conditioning the major muscles of the lower body. To get the best results, and to keep your machine in peak operating condition, you should carefully read and follow the guidelines presented in this manual.

WHAT IS IN THIS MANUAL?

The first part of this manual includes sections on safety, installation, operating instructions, and preventive maintenance. The second part contains detailed information on problem troubleshooting and repair procedures. An Appendix at the end of the manual provides additional information for the owner.

Throughout this manual, console keypad keystrokes are enclosed in []. The names of the keys and special console operational modes are shown in capital letters. For example, your machine is ready to use when the console displays "SELECT WORKOUT." Press [MANUAL] to start the MANUAL exercise program.

WHAT IS THE STAIRMASTER FREECLIMBER EXERCISE SYSTEM?

The StairMaster FreeClimber exercise systems are vertical climbing machines with an independent step action. The independent step action, combined with the patented pedal geometry featured on all StairMaster steppers, provides an aerobic workout equivalent to uphill running or climbing stairs, but without the high-impact pounding to the joints and muscles.

There are five FreeClimber models: the 4600 PT (Personal Trainer), the 4600 CL (Cordless), the 4400 PT, the 4400 CL, and the 4200 PT. All FreeClimbers feature the Quiet Drive transmission. The 4600 PT and the 4600 CL have an adjustable tilting, full-featured Liquid Crystal Display (LCD) console. The 4400 PT and the 4400 CL have an upright, rail-less design. The 4600 PT and the 4400 PT use an external power supply that is plugged into an AC wall outlet. The 4600 CL and the 4400 CL use power generated during a workout to run the electronics. The 4600 PT and 4600 CL have contact heart rate and telemetry (Polar®) heart rate monitoring. The 4400 PT and the 4400 CL feature telemetry heart rate monitoring. The 4200 PT uses an external power supply and the console has less feedback and fewer workout programs than the 4600 PT/CL and the 4400 PT/CL.



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SAFETY GUIDELINES

WHEN USING ELECTRICAL EQUIPMENT, ALWAYS FOLLOW THESE BASIC PRECAUTIONS:

IMPORTANT SAFETY INSTRUCTIONS



This symbol appearing throughout this manual means Attention! Be Alert! Your safety is involved.

The following definitions apply to the words "Danger" and "Warning" found throughout this manual:

DANGER - Used to call attention to IMMEDIATE hazards which, if not avoided, will result in immediate, serious personal injury or loss of life.

WARNING - Used to call attention to POTENTIAL hazards that could result in personal injury or loss of life.

READ ALL INSTRUCTIONS BEFORE USING THE MACHINE.



DANGER

To reduce the risk of electrical shock, always unplug the external power supply from the AC wall outlet before cleaning, maintaining, or repairing.



WARNING

To reduce the risk of burns, electric shock, or injury to persons:

1. The external power supply should always be unplugged from the AC wall outlet before removing or installing parts. Never make adjustments or repairs while an exercise program is in progress.
2. Close supervision is necessary whenever the machine is used by or near children, invalids, or disabled persons.
3. Keep your hands away from all moving parts and keep your feet on the pedals while exercising. Do not operate the machine with the side covers removed.

SAFETY GUIDELINES

4. Use this machine only for its intended use as described in this Manual. Do not use parts, attachments, or accessories other than those provided by StairMaster® Health & Fitness Products, Inc.
5. Do not use the external power supply if it has a damaged cord or plug, or if it is not working properly, if it has been dropped or damaged, or dropped into water. Contact our Customer Service Department at 1-800-331-3578 to arrange for the return of damaged parts.
6. Connect the external power supply to a properly grounded AC wall outlet; refer to the "Grounding Instructions" section. Keep all cords away from heated surfaces.
7. To disconnect the external power supply, remove the plug from the AC wall outlet.
8. Never drop or insert any object into any opening on the machine.
9. Do not operate where aerosol (spray) products are being used.
10. Always wear insulated gloves when handling batteries.
11. Do not crush, incinerate, or dismantle the battery. The electrolyte contains sulfuric acid which can cause serious damage to eyes and skin. Should this occur, flush profusely with water and seek medical attention.
12. Do not use the machine outdoors.

The safety level given by the design of this equipment can only be maintained when the equipment is regularly examined for damage and wear. Inoperable components shall be replaced immediately or the equipment shall be put out of use until it is repaired. Failure to follow all guidelines may compromise the effectiveness of the exercise experience, expose yourself (and possibly others) to injury, and reduce the longevity of the machine. Follow all training instructions listed in the manual and/or on the machine. Physical injury may result from incorrect or excessive training.

SAVE THESE INSTRUCTIONS

INTRODUCTION

Before leaving the manufacturing facility in Tulsa, Oklahoma, your StairMaster® FreeClimber® exercise system was thoroughly inspected and tested to ensure proper operation. The major parts of the machine are shown in Figures 1 and 2.

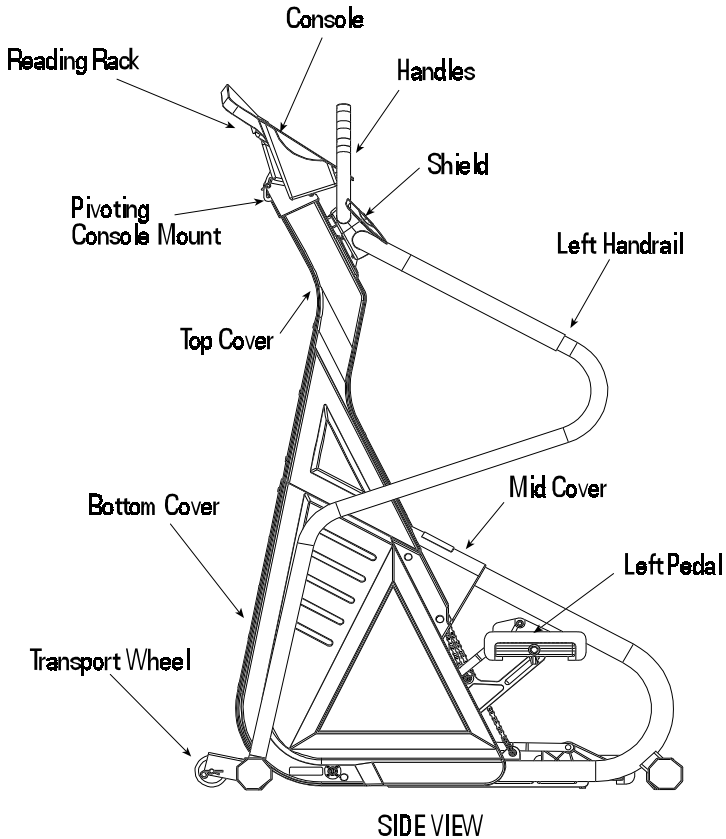


Figure 1: Major Parts - 4600 PT/CL

INTRODUCTION

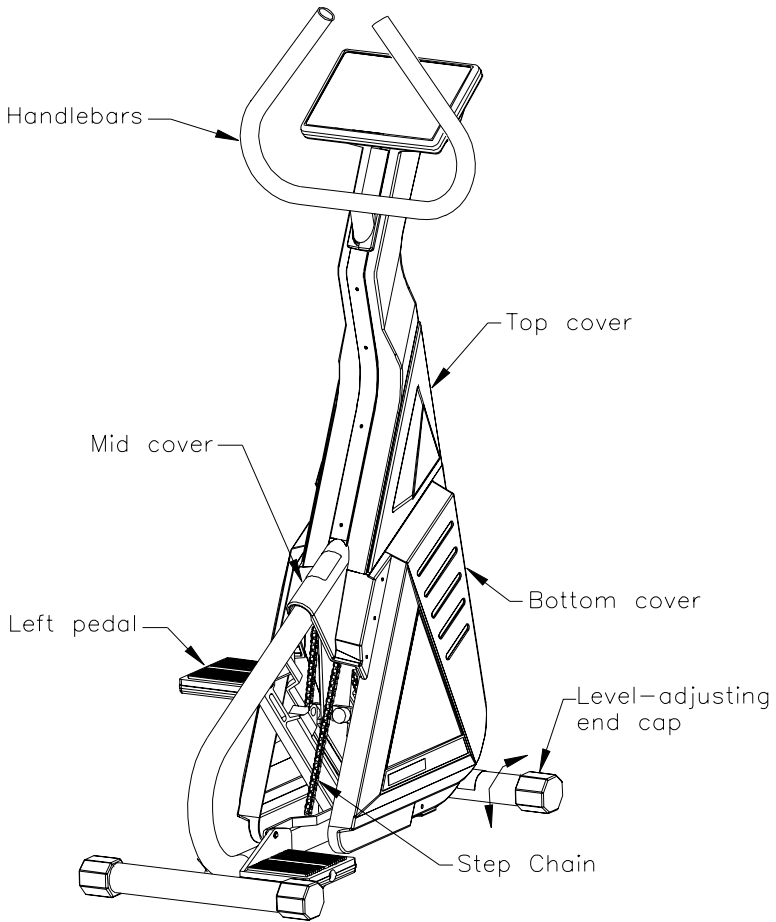


Figure 2: Major Parts - 4200 PT and 4400 PT/CL

INTRODUCTION

Throughout this Manual, all references to the left or right side and to the front or back are made as if you were on the machine, ready to exercise. For example, the console is located on the front of the machine. The dimensions and general specifications of the machines are listed in Table 1.

Table 1. Dimensions and Specifications for the StairMaster® FreeClimber® Exercise Systems

Physical Dimensions:

Length	44 inches (104 cm)
Width at Front Leg (4400 PT/CL, 4200 PT)	22 inches (56 cm)
Width at Front Leg (4600 PT/CL)	32 inches (82 cm)
Height	69 inches (176 cm)
Weight	
4400 PT/CL, 4200 PT	126 pounds (55 kg)
4600 PT/CL	155 pounds (70 kg)

Power Supply Specifications:

4600/4400/4200 PT (U.S., Canada, Japan)	120 VAC, 50/60 Hz, 2.5 Amp
4600/4400/4200 PT (International)	230 VAC, 50/60 Hz, 2.5 Amp

Battery Charger Specifications:

4600/4400 CL (U.S., Canada, Japan)	120 VAC, 50/60 Hz, 1 Amp
4600/4400 CL (International)	230 VAC, 50/60 Hz, 1 Amp

Internal Battery

6 volt, 1 Ah Lead-Acid battery

INSTALLATION INSTRUCTIONS

Assemble your machine before use. Machines shipped outside the United States need to be uncrated before they can be assembled; refer to the "Uncrating Instructions" included with your machine for the details.

1. Remove all shipping material from your machine once it is in place.
2. Make sure the machine is level before you use it for the first time. The four rubber end caps (see Figure 3) are designed to compensate for uneven floors. Each face of the caps is a different thickness. Twist the caps to stabilize the machine.

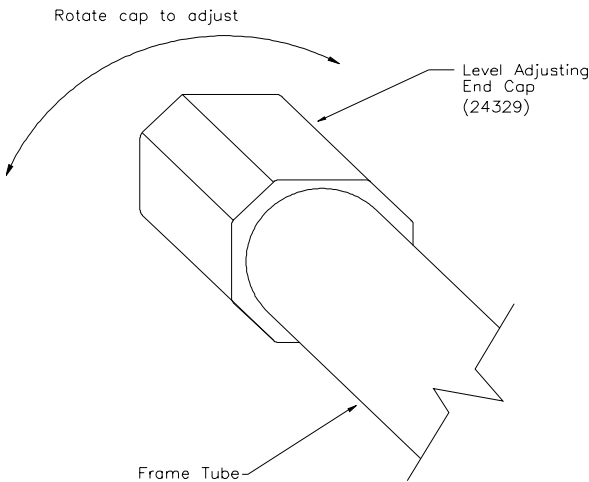


Figure 3: Level Adjusting End Caps

3. Open the box you removed from the pedals. The box contains either an external power supply (4600/4400/4200 PT only) or a wall-pack battery charger (4600/4400 CL only). ***The battery charger is only used to recharge a low battery.***

INSTALLATION INSTRUCTIONS

4. If you have a 4600/4400 CL, skip to step 9. If you have a 4600/4400/4200 PT, connect the DC cable of the power supply to the connector near the bottom of the left side cover (see Figure 4).

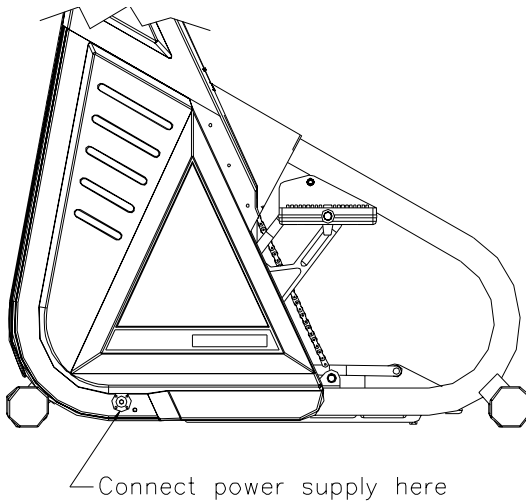


Figure 4: DC Power Connector

5. Place the power supply on the floor near an AC wall outlet. To reduce the hazard of electrical shock, place the power supply in a location away from the machine and away from exposure to perspiration. You should not place your power supply on a carpet because it may over heat.

INSTALLATION INSTRUCTIONS

6. Check to be sure that the input AC power rating marked on the power supply matches the available power. If it does not, obtain the matching power supply from StairMaster® Health & Fitness Products, Inc. before proceeding any further.



WARNING

TO REDUCE THE RISK OF ELECTRICAL SHOCK AND FIRE AND TO PREVENT SEVERE DAMAGE TO THE MACHINE, USE ONLY THE POWER SUPPLY APPROVED FOR USE WITH THIS EQUIPMENT. IN ADDITION, YOUR MACHINE MUST BE PROPERLY GROUNDED.

7. Connect the AC power cord to the AC wall outlet. Refer to the "Grounding Instructions" section if the AC wall outlet does not accept a three-prong plug.
8. Watch the console. The 4600/4400 PT should display a software revision code and then show "SELECT WORKOUT." The 4200 PT console should run through a self test and then display a moving line in the upper LCD window. If the console does not, unplug the power supply and then plug it back in. If the console still does not power up correctly, contact our Customer Service Department. Refer to the Appendix for the appropriate phone number.
9. If you have a 4600/4400 CL, step on the pedals to check for proper operation. Once you step on the pedals, the console should display a software revision code and then show "SELECT WORKOUT." If it does not, connect the battery charger to the connector on the lower left side. If the console still does not power up contact our Customer Service Department. Refer to the Appendix for the appropriate phone number.
10. The display "SELECT WORKOUT" tells you the machine is ready to use. The 4600/4400 PT/CL console displays this message and the 4200 PT displays a moving line in the upper LCD window when the console is ready to use.

BASIC OPERATING INSTRUCTIONS

GENERAL GUIDELINES FOR SAFE OPERATION



WARNING

THESE GUIDELINES ARE DIRECTED TO YOU, AS THE OWNER OF THE MACHINE.
YOU SHOULD INSIST THAT ALL USERS FOLLOW THE SAME GUIDELINES.
YOU SHOULD MAKE THIS MANUAL AVAILABLE TO ALL USERS.

1. Obtain a complete physical examination from your medical doctor and enlist a health/fitness professional's aid in developing an exercise program suitable for your current health status.
2. When working out for the first time, use the MANUAL exercise program at the lower speeds until you feel comfortable and capable of faster speeds.
3. The speed and duration of your exercise program should always be subject to how you feel. Never permit peer pressure to override your personal judgment while exercising.
4. Overweight or severely deconditioned individuals should be particularly cautious when using the machine for the first time. Even though such individuals may not have histories of serious physical problems, they may perceive the exercise to be far less intense than it really is, resulting in the possibility of overexertion or injury.
5. Although all equipment manufactured by StairMaster® Health & Fitness Products, Inc. has been thoroughly inspected by the manufacturing facility prior to shipment, proper installation and regular maintenance are required to ensure safety. Maintenance is the sole responsibility of the owner.

BASIC OPERATING INSTRUCTIONS

YOUR FIRST WORKOUT ON THE STAIRMASTER® FREECLIMBER® EXERCISE SYSTEM

1. Warm up with light calisthenics and easy stretching exercises for at least five minutes before beginning your exercise program.



WARNING

IF AT ANY TIME DURING YOUR WORKOUT YOU FEEL CHEST PAIN, EXPERIENCE SEVERE MUSCULAR DISCOMFORT, FEEL FAINT, OR ARE SHORT OF BREATH, STOP EXERCISING IMMEDIATELY. IF THE CONDITION PERSISTS, YOU SHOULD CONSULT YOUR MEDICAL DOCTOR IMMEDIATELY.

2. Hold onto the handlebars and step up onto the pedals. Stand up straight. The pedals will sink slowly toward the floor.
3. Select the MANUAL exercise program so you can control the pace of your first workout and get used to the exercise motion. Press [MANUAL] and then press [ENTER]. The console will return to the start screen if you do not press [ENTER] within 60 seconds.
4. The console will prompt you to enter your body weight. Enter your weight in pounds (or kilograms if the console is set up for metric units). Correct entry errors by pressing [CLEAR] before you press [ENTER].
5. The console will prompt you to enter your intensity level. Enter your desired intensity level. Correct entry errors by pressing [CLEAR] before you press [ENTER].
6. The console will prompt you to enter the workout time in one minute increments between 5 and 99 minutes. Press [1], [0], [ENTER] to exercise for ten minutes. If you do not start exercising within 60 seconds, the console will return to the start screen.

Begin Exercising

7. Take deep, comfortable steps. Do not let the pedals touch the floor or contact the upper stop. When you begin to exercise, the MANUAL

BASIC OPERATING INSTRUCTIONS

program starts at level three.

8. As you become comfortable with exercise motion, press [LEVEL: ^] and [LEVEL: v] to adjust your climbing speed.
9. Relax and stand up straight while exercising. Use the handlebars for balance (see Figure 5).
10. Select an intensity level that allows you to stay in the middle of the pedal range of motion. Faster is not always better. Exercise at a level that is consistent with your fitness level.

Rest Periods

11. You can stop and rest as many times as necessary for up to one minute for each rest period during all programs. To stop, either press [STOP] or step off the machine. The 4400/4600 PT console returns to the start screen if you rest longer than the allotted rest period. The 4400/4600 CL console will shut off if you rest longer than the allotted rest period. Follow the onscreen prompt to continue your work out after a rest period.

Cool Down

12. When you are finished with your workout, the machine will slow down and the message "GOAL ATTAINED" will be displayed. You can cool down on the machine by continuing to step. The console timer will continue to count up from the selected time, and the intensity level will default to level 3. If there is a time limit set on the console, the timer will last only until the maximum time has been met. For example, if the time limit was set for 30 minutes and you worked out for 25 minutes, the cool down period would last for 5 minutes, or until you stepped off the machine.
13. You can also cool down by getting off the machine walking or stretching for at least five minutes. Lift one foot slowly until the pedal arm contacts the upper stop. Place that foot on the floor. Repeat for the other foot. Do not let the pedals slam into the upper stops, since this may cause unnecessary wear and tear.

BASIC OPERATING INSTRUCTIONS

Figure 5: Correct Exercise Position

Head - Keep your chin parallel to the floor. Avoid staring at your feet or the computer console. This posture will also enhance your breathing.

Back - Although the whole body is in a slightly forward slant, keep your back straight and avoid bending at the waist.

Hips/Torso - Keep your hips directly under you with the buttocks slightly contracted. Avoid letting your hips rock from side to side with each step.

Legs - Use a full, pain-free range of motion with each step, straightening your legs as far as possible without causing discomfort or letting your knees lock out.

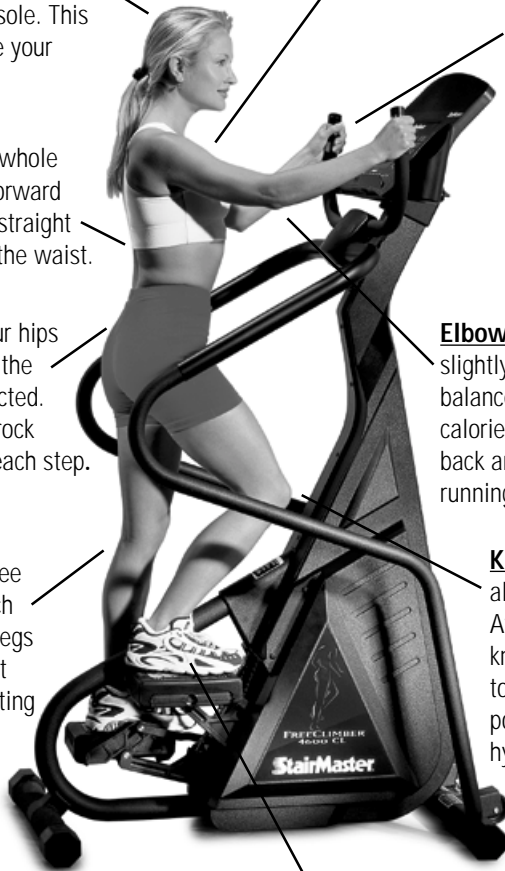
Chest/Shoulders - Keep your shoulders square and centered over your hips with your chest lifted.

Hands - Rest your hands lightly on the side rails or front handlebars. Excessive leaning on the side rails can reduce calorie burn by up to 20%.

Elbows - Keep both elbows slightly bent. If you have good balance and want to burn more calories, you can pump your arms back and forth as if you were running.

Knees - Keep your knees aligned with your toes. Avoid training with your knees too far past your toes and keep your feet pointing forward. Do not hyperextend your knees.

Feet - Place 3/4 of each foot on the pedals, heels slightly off the edge with your toes facing forward.



HEART RATE MONITORING

HEART RATE INPUT

Contact heart rate and telemetry (e.g., Polar®) heart rate signal detection is available. There is no default priority of heart rate input. If a telemetry signal is detected first, contact heart rate signals are inhibited from being detected throughout the rest of the workout session and vice-versa. There is also a short “lock out” period at the beginning of each workout session during which the console first detects a signal and then validates the signal type. The duration of this shorter, initial “lock out” period differs between telemetry and contact heart rate.

- Telemetry heart rate - after the initial belt signal is detected, the console will enter a validation phase in which four good heart beat signals within four seconds are required before locking on telemetry heart rate signals for the duration of the workout session. During the validation phase the console will not recognize contact heart rate signals.
- Contact heart rate - after the initial contact sensor signal is detected, the console will enter a validation phase requiring a good heart beat signal within 10 to 15 seconds, or until the system acquires a valid signal. During the validation phase, the console will not recognize telemetry heart rate signals. The console will display a beating double heart icon that has the inner heart colored in white while searching for a valid signal.

Locked/Non-locked Option

When the “not locked” option is selected the heart rate source signal is not fixed during the exercise (if the signal is lost, either input will be valid). If the “locked” option is selected, then the heart rate source signal is locked on the first detected signal during the workout. To set a heart rate signal input, or to turn off the heart rate option all together, perform the following steps:

1. On the console keypad, press [LEVEL: ^], [3], [2]. At this point the screen will display “HR INPUTS.” Press [ENTER] to select this option.

HEART RATE MONITORING

2. There are four options to handle heart rate input signals. Press the [SELECT] key to scroll through the options until you find the one option that suits your needs. Press the [ENTER] key to select that option.

“ **BOTH HR ON** ” - allows either telemetry or contact heart rate signals to be detected. Once the console has detected a valid input signal it will lock out the opposite type of signal for the duration of the workout session. For example, if you start out using contact heart rate then you are limited to using only contact heart rate during your workout session, even if the signal is lost while performing the workout, and vice-versa.

“ **BOTH NOT LOCKED** ” - allows either telemetry or contact heart rate signals to be detected. Does not lock out a particular input signal for the entire workout. This option will detect either input signal during a workout session, but only one at a time, and only until the other signal terminates.

“ **TELEMETRY ONLY** ” - locks out contact heart rate signals and will only detect telemetry signals.

“ **HAND ONLY** ” - locks out telemetry signals and will only detect contact heart rate signals.

“ **BOTH HR OFF** ” - turns off the ability to detect any signal at all. Used in rare situations where there is excessive interference with the heart rate signals. *This option disables the Constant HR program and the Fitness Test program.

Error Messages

Text line messages are only seen in the Constant Heart Rate and Fitness Test programs due to the design of the program that necessitates a valid heart rate signal during the program. For these programs, ensure that neither the “BOTH HR OFF” or the “HAND ONLY” option is set as a default option.

“**CHECK HR BELT**” - The heart rate signal has been missing for the last 30 seconds in telemetry signal detection.

“**HR BELT NEEDED**” - No telemetry belt signal has been sensed during the initial setup time.

TELEMETRY HEART RATE

“HOLD HR SENSORS” - In contact heart rate signal situations this message will come every 30 seconds to prompt the user to hold the sensors.

“HR MODE DISABLED” - No heart rate signal is allowed due to the set up option that was chosen. Heart rate monitoring is not possible.

TELEMETRY HEART RATE (4600/4400 PT/CL ONLY)

The StairMaster® FreeClimber® 4600/4400 PT/CL features telemetry (Polar®) heart rate monitoring. The system consists of the receiver, located on the step, and a transmitter belt (purchased separately) worn across your chest. The monitoring function is activated as soon as you strap on the chest belt and step within range of the receiver in the machine. Two electrodes on the underside of the chest belt sense the heart rate signal and send it to the receiver. The heart symbol on the console pulses to indicate that the console is receiving a valid signal. A microprocessor in the console calculates the heart rate and displays it, in beats per minute, on the console.

Using the Transmitter Belt



WARNING

PACEMAKER USERS SHOULD NOT USE THE POLAR TRANSMITTER BEFORE CONSULTING THEIR DOCTOR.

Before you put the transmitter belt on, wet the two electrode patches (the grooved rectangles on the reverse side of the belt). Secure the transmitter belt as high under the pectoral muscles (chest) as is comfortable. The transmitter belt should fit snugly and comfortably, and allow normal breathing. When the console detects a heart rate signal, heart rate is shown in the display automatically. Your heart rate in beats per minute and a pulsing heart icon are displayed on the console.

After the initial belt signal is detected, the console will enter a validation phase in which four good heart beat signals lasting four seconds are required before locking on telemetry heart rate signals for the duration of the workout session. During the validation phase the console will not recognize

TELEMETRY HEART RATE

contact heart rate signals. If you do not see a heart rate on the console, try one of the following:

- Move closer to the console.
- Tighten the elastic part of the chest belt.
- Adjust the belt higher or lower on your chest.
- Remoisten the electrodes.
- Test your chest strap with a machine that you know is working, or with a heart rate watch that you know is working.
- If possible, replace or exchange your console with a console (from the same type of machine) that you know is working and retest the machine.
- Verify that the console software has been set up properly for heart rate detection (see pg. 13-14).

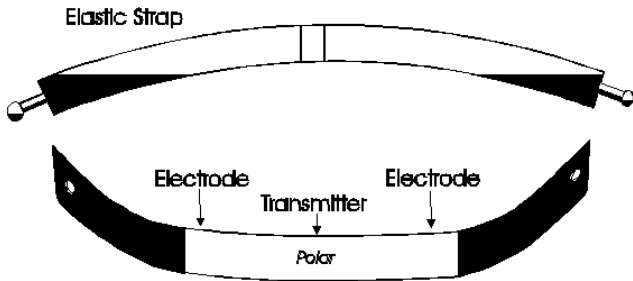


Figure 6: Transmitter Belt

Maintaining the Transmitter Belt

Clean the chest belt regularly with mild soap and water, then dry thoroughly - residual sweat and moisture keep the transmitter active and drain the battery in the transmitter. Do not use abrasives or chemicals such as steel wool or alcohol for cleaning, as they can damage the electrodes permanently. You can order replacement belts from StairMaster, Polar Electro, Inc., or your local fitness store:

StairMaster	800-331-3578	P/N 64000
Polar Electro, Inc.	800-227-1314	

CONTACT HEART RATE

The StairMaster® FreeClimber® 4600 PT/CL features a digitized contact heart rate monitoring system. Through the use of stainless steel sensors built into the upper handles and sophisticated software, heart rate can be checked at any time during a workout. The heart rate is displayed on the console. Contact heart monitoring is standard on the 4600 PT/CL and optional on the 4400 PT/CL.

The contact heart rate system is very accurate (within 3% of the medical standard), but its ability to detect a heart rate signal is influenced by several factors. Movement of the muscles of the upper body produces an electrical signal (muscle artifact) that will interfere with the detection of the heart rate signal by the sensors. Movement of the hands while they are in contact with the sensors also produces interference. Calluses and hand lotion act as an insulating layer to reduce the signal strength. Also, the EKG signal generated by some individuals is not strong enough to be detected by the sensors. Typically, these individuals account for 5 - 7% of the population. These individuals should opt for the Polar® chest strap method of heart rate monitoring. Most people (between 93 – 95%) will not have a problem with the system provided interference from movement is minimal.

Using Contact Heart Rate

Contact heart rate input signals are acquired only during contact between your hands and the stainless steel sensors on the handrails. To use the contact heart rate feature, place your hands around the handles so that your hands touch both the top and the bottom of the sensors. After the initial contact heart rate signal is detected, the console will enter a validation phase requiring a good heart beat signal within 10 to 15 seconds, or until the system acquires a valid signal. During the validation phase the console will not recognize telemetry heart rate signals. The console will display a beating double heart icon that has the inner heart colored in while searching for a valid signal. If, during exercise, the heart rate displayed is erratic, it may be helpful to remove your hands from the handles, wipe them and place them back on the handles. In all programs, the heart rate is shown automatically in the display window the first time the sensors are touched.

FREECLIMBER 4400/4600 PT/CL CONSOLE

The StairMaster® FreeClimber 4400/4600 PT/CL systems console is divided into seven sections: the display window, the workout options, the numeric keypad, the entertainment keypad, the workout statistics, the stop key, and the intensity level keys (see Figure 7).

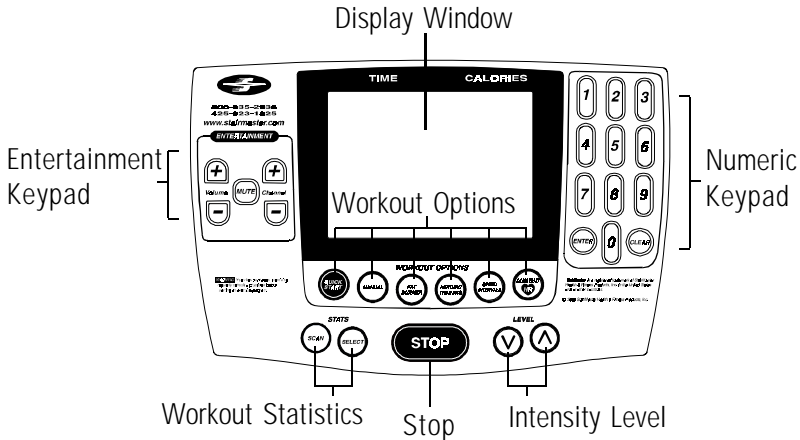


Figure 7: FreeClimber 4400/4600 PT/CL Systems Console

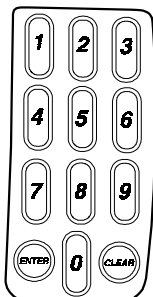
DISPLAY WINDOW



- **Time** - The selected workout time is displayed in the upper left section of the display window. Once the time is entered, the timer will count down, in minutes and seconds, until the workout is finished or stopped. If [0] is entered in the MANUAL or CONSTANT HEART RATE program, the timer will count up.
- **Calories** - The real-time amount of calories burned is continually updated and displayed in the upper right section of the display window.
- **Interval Timer** - The interval timer is displayed below the Time. The interval timer counts down time left within each interval.
- **Heart Rate** - Current heart rate is displayed below the Calories, next to the heart icon.
- **Workout Option Profile** - A profile of the selected exercise program appears in the lower section of the display window during a workout. The taller the column, the higher the intensity (watts) for that interval. The flashing column shows your current interval. The flashing column moves from left to right across the display as you complete each interval.

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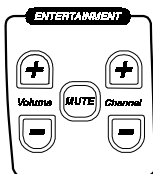
NUMERIC KEYPAD



The numeric keypad is located on the right side of the console. Before the exercise program begins, the numbers are used to enter data in response to the console prompts.

- **Enter** - Confirms workout selections and stores the information used by the console to calculate workout statistics.
- **Clear** - Erases information from the console memory if pressed before [ENTER].

ENTERTAINMENT KEYPAD



The FreeClimber comes equipped to facilitate the use of commercial entertainment systems. Using any of these keys will send an output signal through the Communication Specification for Fitness Equipment (C.S.A.F.E.) port to a connected C.S.A.F.E. or compatible system. If a system is not connected, pressing these keys will have no effect.

- **Volume Up/Down** - Increases or decreases the volume level of the audio source.
- **Mute** - Removes the audio sound from the headphones.
- **Channel Up/Down** - Changes the channel of the commercial entertainment system.

INTENSITY LEVEL KEYS



The exercise intensity level may be changed at any time during a workout. Pressing the [V] key decreases the intensity and pressing the [^] key increases the intensity.

STOP KEY



Press the [STOP] key any time you want to pause the exercise program for up to one minute. Press [STOP] a second time, or [1], and The console will return to the "SELECT WORKOUT" Prompt.

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WORKOUT STATISTICS

During the exercise program, the Stats keys are used to track workout statistics which are then shown in the display window. Pressing the [SELECT] key turns off the scanning feature and shows the statistic of choice in the display window. Continue to press the [SELECT] key until you reach the desired statistic. Pressing the [SCAN] key will prompt the console to cycle through the following statistics:

- **Distance** - Provides a cumulative total of the equivalent distance (in miles or kilometers), you would have traveled while riding a bicycle outdoors at the same relative intensity.
- **Calories/Hour** - Provides a running total of the number of calories burned during a workout.
- **Rate** - Displays the current steps per minute.
- **Floors** - Displays the equivalent number of floors climbed with an 8-inch step. There are 16 steps per floor, and 48 floors per mile.
- **Level** - Shows the current intensity level between 1 (the easiest) and 20 (the hardest).
- **Watts** - Displays the exercise intensity in watts (746 watts = 1 horsepower).
- **METs** - Gives you the relative energy cost of exercise. MET stands for multiples of the resting metabolic rate. While you are sitting quietly, your body consumes oxygen at the rate of about 3.5 milliliters per kilogram of body mass per minute. When you exercise, your body needs more oxygen in order to function. For example, exercising at 10 METs requires ten times the resting rate of oxygen consumption, or about 35 milliliters per kilogram per minute. During a workout, this key shows the current MET level. During the workout summary, the average MET level is displayed.
- **Target Heart Rate** - Available only during the Constant Heart Rate program. Shows the selected target heart rate.

At the completion of a workout, the statistic averages are calculated based on the accumulation of data during the workout program, and not including the cool down period.

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EXERCISE PROGRAM KEYPAD

The exercise keypad is located below the display and to the left of the function keypad. While the console is in the "SELECT WORKOUT" mode, press one of the exercise program keys to preview the desired workout. There are six workout programs with the following standard defaults (pressing [ENTER] without inputting data first will prompt the console to enter these values):

- **Weight** - 175 lbs.
- **Intensity Level** - 3
- **Workout Time** - The default time in the programmed workouts and Quick Start is 20 minutes. The Manual and Constant Heart Rate programs do not have a specified default time. In these programs, the console timer will count up to the maximum time of 99 minutes, and then return to 0.
- **Age** (Constant Heart Rate program only) - 40 years

Once you have selected a program, the prompts are:

- "**ENTER BODY WEIGHT**" - type in your body weight in pounds (or kilograms if your console is set to metric units).
- "**ENTER LEVEL 1 - 20**" - select your intensity level with level 1 being the easiest and level 20 the hardest.
- "**ENTER TIME 5 - 99**" - select the workout duration in one minute increments from 5 to 99. Press 0 in the MANUAL and CONSTANT HEART RATE program to workout for an unspecified amount of time.

The Quick Start Program

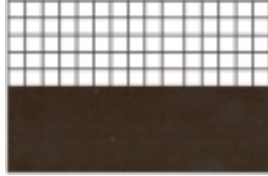
Provides an immediate start, without having to enter any user information. This program uses the standard default settings for derivation of calories burned.

The Manual Program

After pressing the [MANUAL] key, enter user and workout information. Begin exercising at the selected level. If desired, adjust the workout manually by using the intensity level arrow keys. The profile in the display window is divided into 15 equal intervals within the workout time. The profile is based

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on the selected intensity level, with 2 levels equating to one vertical bar.



The Fat Burner Program

The Fat Burner program is a 60-interval workout designed for people just starting a weight control program. The relative intensity level is indicated on the profile and any changes in the intensity level will continue for the remainder of the program.



The Aerobic Training Program

The Aerobic Training program is a 60-interval workout designed to increase aerobic capacity. The relative intensity level is indicated on the profile and any changes in the intensity level will not change the look of the remaining profile.

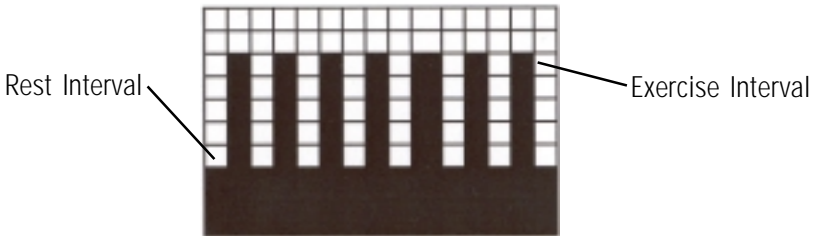


The Speed Intervals Program

The Speed Intervals program is a workout with 8-rest intervals and 7-exercise intervals that alternate speed/intensity level changes. You can change the REST interval speed/level and the EXERCISE interval speed/level independently, using the level keys. For example, if you decrease the intensity level during a rest interval then subsequent rest intervals will be the same. However, the EXERCISE interval remains at the same intensity level you started with. To change the intensity level of the EXERCISE interval, you must change

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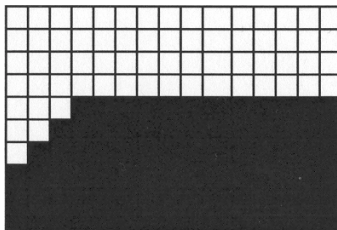
the intensity level during an EXERCISE interval. The intensity level shown during an EXERCISE interval is indicative of your current speed. However, the current speed during a REST interval is equal to a scaled percentage of the displayed intensity level. Note that the program profile does not change at any time during the workout session.



The Constant Heart Rate Program

The Constant Heart Rate program maintains a chosen target heart rate by automatically varying the climbing speed during each workout. The default target heart rate is equal to 70% of your maximum heart rate which is calculated by the following equation: $220 - (\text{Age}) \times .70$. Choose a different target heart rate (between 80 and 180 beats per minute) at any time during the workout by using the numeric keypad to enter the new target heart rate, followed by the [ENTER] key. The following messages may be shown during a workout:

- **“CHECK HR BELT”** - The heart rate signal has been missing for the last 30 seconds in telemetry signal detection.
- **“HR BELT NEEDED”** - No telemetry belt signal has been sensed during the initial setup time.
- **“HOLD HR SENSORS”** - In contact heart rate signal situations this message will come every 30 seconds to prompt the user to hold the sensors.
- **“HR MODE DISABLED”** - No heart rate signal is allowed due to the set up option that was chosen. Heart rate monitoring is not possible.



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THE FITNESS TEST PROGRAMS

Understanding Submaximal Exercise Testing

Before using the StairMaster® FreeClimber® for submaximal exercise testing, it should be noted that all submaximal fitness tests make several assumptions:

- That a steady-state heart rate is obtained for each exercise workload.
- That a linear relationship exists between heart rate, oxygen uptake and workload.
- That the maximal heart rate for a given age is uniform.
- That the mechanical efficiency of the physical activity performed (i.e., oxygen uptake at a given workload) is the same for everyone.

It should be kept in mind that any one or all of the above mentioned assumptions may not be met during a submaximal exercise test. If for any reason one of the assumptions is not met, then errors in predicting $\text{VO}_{2\text{max}}$ will occur.

Unfortunately, it is often quite difficult to meet all of the requirements for the four listed assumptions. For example, exercising at a given workload for only a few minutes can involve an insufficient amount of time for many individuals to achieve a true steady-state. To ensure that a steady-state has been achieved, the heart rate should be measured after two minutes of exercise at a given workload and again after the third minute of exercise at that workload. These two heart rates should then be compared. If a difference of more than five beats per minute between the two is found, the subject should continue to exercise at one-minute intervals at the same workload until two successive heart rates differ by less than five beats per minute.

It is also important that the submaximal heart rates obtained be between 115 and 150 beats per minute, because it is within this heart rate range that a linear relationship tends to exist between heart rate and oxygen uptake or workload for most adults. When the heart rate is less than 115, many external factors (e.g., talking, laughing, apprehension, etc.) can greatly influence heart rate. Once the heart rate reaches a level between 115 and

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150, external factors no longer influence heart rate, and a linear relationship exists. As the heart rate rises above 150, the heart-rate/oxygen uptake relationship becomes curvilinear.

The third assumption involves maximal heart rate. Maximal heart rate is the greatest heart rate that can be measured when an individual is exercising to the point of volitional fatigue (i.e., exhaustion) during a graded exercise test. Several equations have been developed to estimate the average maximal heart rate for humans:

- Maximal heart rate = 220 minus age (low estimate)
- Maximal heart rate = 210 minus [0.5 x age] (high estimate)
- Maximal heart rate = 226 minus age (estimate for older individuals)

Maximal heart rate can, however, vary greatly among different individuals of the same age. One standard deviation is ± 12 bpm, which means that two-thirds of the population varies an average of plus or minus 12 heart beats from the average given by a prediction equation. If an individual's age-predicted maximal heart rate is higher than that person's true maximal heart rate, then his/her estimated $VO_{2\max}$ will be an overestimation of the correct or actual value.

The final assumption addresses the issue of mechanical efficiency. Oxygen uptake at any given work rate can vary by approximately 15% between different individuals. Therefore, individuals vary in the amount of oxygen they require to perform a certain exercise workload. Some individuals are more efficient at performing a given task than others. As a result, the average oxygen consumption associated with a given workload may vary significantly from one person to another. Thus, $VO_{2\max}$ predicted by submaximal exercise tests tends to be overestimated for those who are mechanically efficient and underestimated for those who are inefficient.

The point to remember is that submaximal exercise testing, though not as precise as maximal exercise testing, is not without advantages. For example, the results of such testing can provide a fairly accurate reflection of an individual's fitness status without the cost, risk, effort (on the part of the subject) and time involved in max testing. If an individual is given repeated

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submaximal exercise tests and that person's heart rate response to a fixed workload is found to decrease over time, it is reasonably safe to conclude that the individual has made improvements in aerobic (cardiorespiratory) fitness, irrespective of the accuracy of the $VO_{2\max}$ prediction.

Pretest Screening

Prior to any exercise test (maximal or submaximal), participants should complete a brief health/medical questionnaire, have their resting blood pressure and heart rate measured, and provide an informed consent form. The Physical Activity Readiness Questionnaire (PAR-Q) is an example of a valid health/medical questionnaire for screening individuals prior to submaximal exercise testing. Canadian health and fitness practitioners have extensively (and quite successfully) used the PAR-Q to determine whether individuals should be given an exercise test. A "yes" answer to any of the following seven questions taken from the PAR-Q would disqualify a participant from taking part in an exercise test until appropriate medical clearance was obtained.

PHYSICAL ACTIVITY READINESS QUESTIONNAIRE (PAR-Q)

1. Has your doctor ever said you have a heart condition and recommended only medically supervised physical activity?
2. Do you have chest pain brought on by physical activity?
3. Have you developed chest pain within the past month?
4. Do you tend to lose consciousness or fall over as a result of dizziness?
5. Do you have a bone or joint problem that could be aggravated by the proposed physical activity?
6. Has a doctor ever recommended medication for your blood pressure or a heart condition?
7. Are you aware, through your own experience or a doctor's advice, of any other physical reason against your exercising without medical supervision?

The StairMaster Submaximal Fit Test

The StairMaster branching protocol is a series of 3-minute stages of continuous exercise at increasing intensity. The first stage is a warmup at approximately 4 METs. The intensity of the remaining stages is based on the heart rate response to the warmup. The test is designed to raise the steady-

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state heart rate of the subject to 110 to 150 beats/min for two consecutive stages. It is important to remember that two consecutive heart rate measurements must be obtained in the 110 to 150 beats/min range to predict VO_{2max} . The test typically lasts from 9 to 15 minutes.

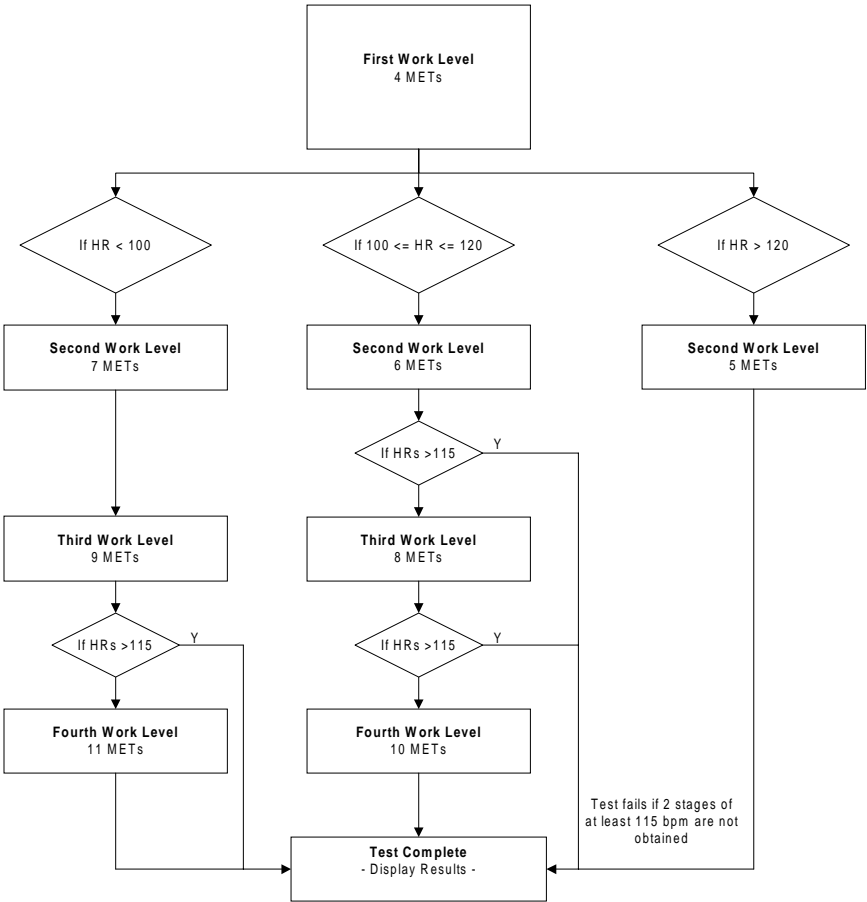
In the StairMaster protocol, each work rate is performed for 3 minutes, with heart rates recorded during the final 4 seconds of the 2nd and 3rd minutes of each stage. If the heart rates are within 5 beats/min, then the heart rate during the last minute is plotted against the work rate, and the program advances to the next 3-minute stage. The program continues for 2 to 4 stages until 2 steady state heart rates between 110 to 150 beats/min are obtained in 2 consecutive stages. The line generated from the plotted points is then extended to the age-predicted maximal heart rate. A corresponding maximal work rate and VO_{2max} can then be calculated.

At the end of the 3rd minute of each stage, if the heart rates at the end of the 2nd and 3rd minute are not within 5 beats/min of each other, then that work rate is maintained for an additional minute. At the end of the 4th minute, the heart rate is compared to the heart rate at the end of the 3rd minute. If the heart rates are within 5 beats/min, then the heart rate during the 4th minute is plotted against the work rate. If the heart rate at the end of the 3rd and 4th minute are not within 5 beats/min, then the work rate is maintained for one more additional minute. If the heart rate at the end of the 4th and 5th minutes are within 5 beats/min, then the heart rate at the end of the 5th minute is plotted against the work rate. If the heart rate at the end of the 4th and 5th minutes are not within 5 beats/min, then the test failed.

Once 2 consecutive heart rate measurements are obtained in the 110 to 150 beats/min range, then the test ends successfully and the results are displayed. The estimated maximum aerobic capacity is shown in ml/kg/min and METs. Next, the results are compared to normative values for others of the same age range and gender (see Table 2). Results are stored in the console until the next person starts an exercise program.

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Figure 8: StairMaster® Fitness Protocol



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Table 2. Fitness Rating Norms (VO_{2max})

<u>MEN</u>					
Age	High	Good	Average	Fair	Low
20 – 29	>51	51 – 47	47 – 43	42 – 40	<39
30 – 39	>50	50 – 45	45 – 41	41 – 37	<37
40 – 49	>48	48 – 42	42 – 38	38 – 35	<35
50 – 59	>45	45 – 39	38 – 35	35 – 32	<32
60+	>43	42 – 35	35 – 32	32 – 29	<29
<u>WOMEN</u>					
Age	High	Good	Average	Fair	Low
20 – 29	>44	44 – 38	38 – 35	35 – 32	<32
30 – 39	>41	41 – 37	37 – 34	34 – 31	<30
40 – 49	>40	39 – 34	34 – 31	31 – 28	<28
50 – 59	>35	35 – 31	31 – 28	28 – 26	<25
60+	>35	35 – 39	29 – 26	26 – 24	<24

The Firefighter’s Stair Climb Tests

The StairMaster® Stepmill® is routinely used to assess the aerobic fitness levels of fire fighters in full protective gear carrying heavy equipment. The Candidate’s Physical Ability Test (CPAT), approved by the International Association of Fire Fighters (IAFF) and reviewed by the U.S. Justice Department, requires each candidate to step on the Stepmill at a predetermined stepping pace for a specific period of time. There are two fire fighter specific Stair Climb Test programs. The first test is the CPAT Stair Climb Test. The second test is a modified version of the CPAT test that is used by the New York City Fire Department (NYCFD). **Both tests can now be simulated on the StairMaster FreeClimber machines.**

- CPAT Stair Climb Test – (Fit Test #2) The first phase is a warmup interval at intensity of 56 steps/min and lasts 20 seconds. At the end of the first interval the time counter will reset to zero. The second phase continues through nine 20 second

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intervals at an intensity of 68 steps/min. The CPAT Stair Climb Test has a total of 10 intervals and lasts for 3 minutes, 20 seconds (including warmup).

Turning on the CPAT Stair Climb Test

1. Press [∧], [9], [1], [ENTER], on the console keypad. Make sure to press in the middle of each key and be aware that the corresponding numbers will not show in the console display.
 2. The console will prompt you to "BEGIN FIT TEST." The test can be stopped at any time by pressing [STOP].
- NYCFD Stair Climb Test – (Fit Test #3) The first phase is a warm-up interval at an intensity of 56 steps/min and lasts 60 seconds, followed by a 60 second rest period (no stepping). At the end of the rest period the time counter will reset to zero. The second phase is at an intensity of 68 steps/min and lasts for 5 minutes, 12 seconds.

Turning on the NYCFD Stair Climb Test

1. Press [∧], [9], [2], [ENTER], on the console keypad. Make sure to press in the middle of each key and be aware that the corresponding numbers will not show in the console display.
2. The console will prompt you to "BEGIN FIT TEST." The test can be stopped at any time by pressing [STOP].

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CONSOLE CODES

There are three groups of console codes which are differentiated according to function. The first group of codes are customization codes and are used to set defaults such as units, language, heart rate input type, etc. The second group of codes are machine status codes and are used to track hours and other general usage patterns for maintenance purposes. The third group of codes are diagnostic codes and are used for troubleshooting. The following key actions are valid in each group of console codes:

- Pressing [LEVEL ^], [1st #], [ENTER] displays what group of codes is being accessed.
- Pressing [SELECT] or [LEVEL ^] at that point allows you to view all possible selections. Once in this mode pressing [LEVEL v] backs up through the selections; pressing [ENTER] then selects that item. If another test level is available at this point, the [SELECT] / [ENTER] process is repeated.
- Pressing [^] [1st #, or 2nd #], [ENTER] selects that item directly.
- Pressing [CLEAR] exits any of the special access modes.

Custom Codes

[^][3][0]	change workout time limit between 5 to 99 minutes
[^][3][1]	change units (MPH or KMH)
[^][3][2]	choose type of heart rate input and priority (telemetry or contact)
[^][3][3]	- N/A -
[^][3][4]	choose console language
[^][3][5]	change contrast on console
[^][3][6]	- N/A -
[^][3][7]	- N/A -
[^][3][8]	- N/A -
[^][3][9]	reset to factory defaults

1. Change the workout time by pressing [LEVEL: ^], [3], [0]. The console will display "MAX TIME." Press [ENTER]. The console will then display the current time limit. Use the keypad to enter the desired time, then press [ENTER]. For no time limit, press [0].

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2. Change the units to either Metric or USA units by pressing [LEVEL: ^], [3], [1], [ENTER]. The console will display the current units - either "USA UNITS" or "METRIC UNITS." Use the [SELECT] key to change option, and then press [ENTER].
3. Choose the desired heart rate input preference by pressing [LEVEL: ^], [3], [2]. The console will then display "HR INPUTS." Press [ENTER]. The console will then display the current hear rate input selection. Press the [SELECT] key to scroll through the other options. Press [ENTER] after the desired option.
4. Change the language by pressing [LEVEL: ^], [3], [4]. The console will display "LANGUAGE." Press [ENTER]. The console will then display the current language. Press the [SELECT] key to scroll through the other options. Press [ENTER] to change the option.
5. Adjust the contrast on the LCD screen by pressing [LEVEL: ^], [3], [5]. The console will display "CONTRAST ADJ." Press [ENTER]. The console will then display the current contrast number. Press the [LEVEL: ^], and [LEVEL: v] keys to increase or decrease the contrast. The changed value will remain on exit.
6. Reset the console to factory defaults by pressing [LEVEL: ^], [3], [9]. The console will display "SET DEFAULTS ." Press [ENTER]. Then console will rest itself and then display "DONE."

Quick Scan Programming

You can quickly access any of the custom menus by pressing [LEVEL: ^], [3], [ENTER]. The console will then display "CUSTOMIZE." Scroll through the following options:

[SELECT]	" MAX TIME "	0
[SELECT]	"CHANGE UNITS"	1
[SELECT]	"HR INPUTS"	2
[SELECT]	"LANGUAGE"	4

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[SELECT]	"CONTRAST ADJ"	5
[SELECT]	"MAX SPEED" - N/A -	6
[SELECT]	"CLINICAL MODE" - N/A -	7
[SELECT]	"SET DEFAULTS "	9

Machine Status Codes

[^][4][0]	display machine run time in hours
[^][4][1]	display number of workouts
[^][4][2]	display distance traveled
[^][4][3]	display software rev
[^][4][4]	display machine type
[^][4][5]	-N/A-
[^][4][6]	display machine run time in hours since last cleared (used for maintenance)

1. Display the machine run time by pressing [LEVEL: ^], [4], [0]. The console will display "RUN HOURS XXXXX".
2. Display the number of workouts by pressing [LEVEL: ^], [4], [1]. The console will display "WORKOUTS XXXX."
3. Display the total distance covered up to date by pressing [LEVEL: ^], [4], [2]. The console will then display "DISTANCE XXXX."
4. Display the console software revision number by pressing [LEVEL: ^], [4], [3]. The console will display "CONS 92111-XXX."
5. Display the machine type by pressing [LEVEL: ^], [4], [4]. The console will display "STEPPER (or other machine type)."
6. Display the machine run time since last cleared by pressing [LEVEL: ^], [4], [6]. The console will display "MAINT HOURS XXXX."

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Quick Scan Programming

You can quickly access any of the custom menus by pressing [LEVEL: ^], [4], [ENTER]. The console will then display "MACHINE STATUS." Scroll through the following options:

[SELECT]	" RUN HOURS	XXXX"	0
[SELECT]	" WORKOUTS	XXXX"	1
[SELECT]	" DISTANCE	XXXX"	2
[SELECT]	" CONS	90211- XXX "	3
[SELECT]	" STEPPER"		4
[SELECT]	-N/A-		
[SELECT]	" MAINT HOURS	xxxx"	6

Resetting the Maintenance Hour Counter

For ease of maintenance records, the 4400/4600 PT/CL console has a maintenance timer that will clock the number of hours, workouts, and time between last servicing. After each maintenance period reset the counter.

[^][7][1] Reset Service

1. Reset the maintenance hour counter by pressing [LEVEL: ^], [7], [1]. The console will display "RESET SERVICE." Press [ENTER]. The console will display "DONE." Press [CLEAR] to return to the starting screen.

Configuration Code

The FreeClimber® console supports other StairMaster® exercise systems. It is important to verify that the machine configuration code matches the type of machine you have.

[^][8][0] Change Machine

1. Change the machine type by pressing [LEVEL: ^], [8], [0]. The console will display "CHANGE MACHINE." Press [ENTER]. The console will then display the current machine type. Use the [SELECT] key to toggle between options. Press [ENTER] for the desired option.

FREECLIMBER 4200 PT CONSOLE

The StairMaster® FreeClimber® 4200 PT console is divided into two LCD display windows. There is a four-function keypad located below the bottom window (see Figure 9). While you are exercising, the bottom window scrolls through a display of four workout statistics. An arrow on the side of each LCD window points to the name of what is being displayed.

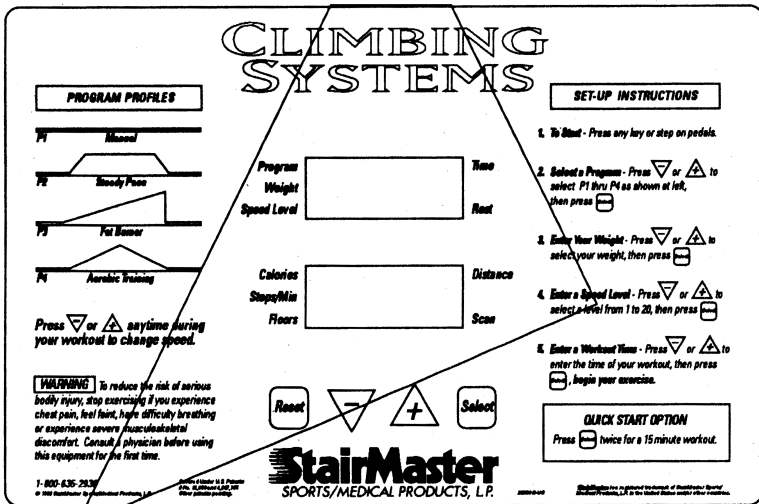


Figure 9: 4200 PT Console Diagram

TOP WINDOW

The top LCD window displays information while you set up your workout. It also displays elapsed time during your workout or during your rest period.

Workout Setup

- While the console is in the ATTRACT mode, either press [START/STOP] or step on the pedals. Look at the top LCD window.
- The arrow pointing to the word "Program" should be flashing and "P1" should be displayed. P1 corresponds to the MANUAL program. Use the [+ or - ARROW] to change the workout option. "P2"

FREECLIMBER 4200 PT CONSOLE

corresponds to Steady Pace, "P3" to Fat Burner, and "P4" to Aerobic Training. The different workout option profiles are shown on the right side of the console.

3. When the correct workout option is displayed on the top LCD window, press [ENTER/SELECT].
4. The arrow pointing to the word "Weight" will flash and the number "150" will be displayed. Use the [+ or - ARROW] to adjust it to your body weight. Press [ENTER/SELECT] when it is correct.
5. If you selected a workout option other than "P1" [MANUAL], the arrow pointing to the words "Speed Level" will flash and the number "10" will be displayed. Adjust the level between 1 (the slowest) and 20 (the fastest) with [+ or - ARROW]. Press [ENTER/SELECT] when it is correct

If you selected [MANUAL], your workout will start at speed level 3. Level 1 is the slowest and level 20 is the fastest. Use the [+ or - ARROW] to adjust the climbing speed once your workout begins.

6. The arrow pointing to the word "Time" will flash and the number "15" will be displayed. Press the [+ or - ARROW] to adjust the length of your workout between 5 and 45 minutes.
7. Press [ENTER/SELECT]. Begin exercising.

Timer

During your workout, the top window keeps track of your workout time in minutes and seconds. The display arrow points to the word "Time" on the console.

You may rest for up to 30 seconds at any time during your workout. Either stop stepping or press [START/STOP] to begin your rest period. To resume your workout, step on the pedals. If you press [START/STOP] during a rest period, or if you rest for more than 30 seconds, the console will return to the ATTRACT mode.

FREECLIMBER 4200 PT CONSOLE

BOTTOM WINDOW

The bottom LCD window keeps track of four different statistics during your workout: the number of calories burned, the climbing speed in steps per minute, the total number of floors climbed, and the total distance covered. As the console scrolls through each statistic, an arrow on the side of the display window points to the name of what is being shown.

- **Calories.** Provides a running total of the number of calories burned during a workout.
- **Steps/Min.** Indicates the climbing speed based on an 8-inch step.
- **Floors.** Shows the total number of floors you have climbed. There are 16 eight-inch steps per floor.
- **Distance.** Provides the equivalent horizontal distance you would have traveled if you used the same amount of energy. There are 48 floors per horizontal mile.

When the display arrow points to the word "Scan," all workout statistics are scrolled. Press [ENTER/SELECT] during your workout to lock the bottom display window on any one statistic. For instance, press [ENTER/SELECT] three times to lock the display on the total number of floors climbed. Press [ENTER/SELECT] two more times to resume scrolling the statistics. During rest periods, only Calories, Floors, and Distance are shown (even if the display is locked on one statistic). At the end of your workout, these same three statistics are shown one last time.

Keypad

ENTER/SELECT. During workout setup, press this key to enter your personal information and then move to the next entry. During your workout, press this key to lock the bottom display window on any one statistic or to return to the scrolling mode.

+ or - ARROWS. During workout setup, press these keys to adjust your personal information before you press [ENTER/SELECT]. During your workout, use these keys to adjust the level (or climbing speed).



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START/STOP. Press this key while the console is in the ATTRACT mode to begin the workout setup. If pressed at any time during workout setup, all entries are cleared and workout setup starts over again. If pressed during a workout, a 30-second rest period is started. If pressed during a rest period, the console returns to the ATTRACT mode.

QUICK START OPTION

You can quickly start the MANUAL program ("P1") by pressing [ENTER/SELECT] twice (double-clicking) at the start of workout setup. The workout statistics are based on a 150-pound person, the climbing speed starts at level 3, and the workout time is set to 15 minutes. Use the [+ or - ARROW] to adjust the climbing speed once your workout starts.

MAINTENANCE INSTRUCTIONS

HELPFUL HINTS

Read all maintenance instructions thoroughly before beginning work. In some cases, an assistant is required to perform the necessary tasks. All references to the right or left side and to the front or back are made as if you were on the machine ready to exercise. Major component names and locations are shown in Figure 11.

TOOL LIST

The following tools are needed to perform service and maintenance:

- Torx screwdriver
- combination wrenches (sizes 7/16 - 3/4")
- combination pliers
- volt-ohm meter (multimeter)
- allen wrench set (sizes 5/64 - 1/4")
- shop goggles or other eye protection
- socket set or nut driver set (sizes 1/4 - 3/4" in 1/16" increments)
- phillips screwdriver
- wonder bar (included w/ unit)
- locking pliers
- wire stripper/crimper tool
- external snap ring pliers
- torque wrench

MAINTENANCE RECORDS

For ease of maintenance the 4400/4600 PT/CL console will keep track of hours, number of workouts, time between last servicing, etc. You can quickly access any of the custom menus by pressing [LEVEL: ^], [4], [ENTER]. The console will then display "MACHINE STATUS." Scroll through the following options:

[SELECT]	" RUN HOURS	XXXX"	* 0
[SELECT]	" WORKOUTS	XXXX"	1
[SELECT]	" DISTANCE	XXXX"	2
[SELECT]	" CONS	90211- XXX "	3
[SELECT]	" STEPPER"		4
[SELECT]	-N/A-		
[SELECT]	" MAINT HOURS	xxxx"	6

*The machine may show a few hours of use due to testing at the manufacturing facility.



MAINTENANCE INSTRUCTIONS

The 4200 PT console keeps track of the number of hours the machine was used and the total number of floors climbed. From the ATTRACT mode, press [+ ARROW] and then double-click [RESET]. The hours are shown in the top LCD window and the total floors are shown in the bottom LCD window.

INITIAL SERVICE

Upon receiving your machine, use a soft, clean towel to wipe off the dust which may have accumulated during shipping. Your new machine will require minor assembly. Refer to the “Installation Instructions” section for details.

PREVENTIVE MAINTENANCE

Most of these preventive maintenance procedures can be performed after removing the mid-cover. The preventive maintenance schedule is summarized in Table 3. The schedule is based on normal usage in a commercial health club environment; adjust the schedule to meet actual machine usage. Refer to the “Parts Removal and Replacement” section for all disassembly and assembly instructions.

Cleaning

1. DO NOT USE GLASS CLEANERS OR ANY OTHER HOUSEHOLD CLEANERS ON THE CONSOLE. Clean the console daily with a water-dampened cloth and wipe dry after cleaning.
2. Clean the exterior of the machine daily using soap and water or a diluted household cleaner such as Fantastic®.
3. Thoroughly clean the entire machine, including the interior, at least once a week (see Table 3).

Inspecting

1. Inspect the frame for any rust, bubbling, or paint chips during the weekly cleaning. The salt in perspiration can damage the unpainted surfaces.

MAINTENANCE INSTRUCTIONS

2. Inspect the Poly-V belt and HTD belts for excessive wear during the quarterly lubrication. Adjust the belt tension if necessary.

Lubrication

There are nine components that need periodic lubrication: the drive chain, the step chains, the pedal arm return springs, the step chain connection points, the pedal arm bushings, the leveling arm bushings, the spring pulley shafts, the pedal shafts and the leveling arm pins. These parts are shown in Figure 11, page 74. Remove the bottom cover to get to the components. If you have a 4600 PT/CL you will also need to remove the upper covers.

1. Place a protective mat on the floor while you lubricate your machine. A rubber floor mat is available from StairMaster® Health & Fitness Products, Inc.
2. Lubricate the drive chain and the step chains weekly. Try to penetrate the entire length of the chains with 30W motor oil.
3. Remove the drive chain and step chains every three months to thoroughly clean and lubricate them. Use a mild degreaser and a stiff brush to remove dirt and corrosion from the chains.
4. Unhook the pedal arm return springs from the spring hanger every week. To protect them from corrosion, wipe the entire length of each pedal arm return spring with a cloth dampened with 30W motor oil before reconnecting it. Replace the spring if it is rusty or otherwise damaged.
5. Remove the double pitch master link from the step chain connection points every three months. Clean the master link and the bushing in the pedal arm. Lubricate the master link and bushing with a thin coat of multi-purpose grease before reassembling.
6. Remove the pedal arms and leveling arms every three months. Clean the pedal arm and leveling arm shafts and bushings with a clean cloth. Protect the shafts from corrosion by wiping them with a cloth dampened with 30W motor oil.

MAINTENANCE INSTRUCTIONS



WARNING

TO REDUCE THE POSSIBILITY OF SLIPPING, BE SURE THE PEDAL AREA IS FREE OF GREASE OR OIL. WIPE ANY EXCESS OIL OFF THE MACHINE SURFACES.

7. Remove the spring pulleys every three months. Clean the spring pulley shafts with a dry cloth. Protect the shafts from corrosion with a thin coat of multi-purpose grease before reassembling.
8. Remove the pedals every three months. Clean the pedal shaft and leveling arm pin with a dry cloth. Protect the pedal shaft and leveling arm pin from corrosion with a light coat of multi-purpose grease before reassembling.

Battery Charge

If you have a 4600/4400 CL, remove the bottom cover and check the battery voltage level every three months.

1. Using your multimeter, touch the red lead to the positive terminal of the battery and the black lead to the negative terminal.
2. If the voltage level is less than 6.1 VDC, charge the battery. Plug the wall pack battery charger into the connector located near the bottom of the left bottom cover. Charge the battery for approximately 24 to 48 hours and then recheck it. It is okay to use the machine while the battery charger is connected.

Battery Disposal

When ordering new batteries, you will need to properly dispose of (recycle) your old lead-acid batteries. Most federal and state regulations require lead-acid batteries to be recycled. Do not throw away old batteries. Lead is a toxic heavy metal, hazardous to living organisms. Disposal instructions and a list of recycling centers are tabulated in the Appendix. If you have questions, contact the Customer Service Department at (800) 331-3578.

MAINTENANCE INSTRUCTIONS

Table 3: Recommended Preventive Maintenance Schedule

PART	RECOMENDED ACTION	FREQUENCY	CLEANER	LUBRICANT
Console	Wipe Clean	Daily	Water	N/A
Covers	Clean and Inspect	Daily	Diluted household cleaner	N/A
Drive and Step Chains	Lubricate	Monthly or after 300 hours of use	N/A	30W motor oil
	Clean and lubricate	Quarterly or after 900 hours	Mild degreaser	30W motor oil
Step Chain Connection Points	Clean and lubricate	Every 3 months or after 900 hours	Clean, dry rag	Multi-purpose grease
Spring Pulley Shafts	Clean and lubricate	Every 3 months or after 900 hours	Clean, dry rag	Multi-purpose grease
Pedal Shafts and Leveling Arm Pins	Clean and lubricate	Every 3 months or after 900 hours	Clean, dry rag	Multi-purpose grease
Pedal Arm Springs	Inspect and wipe down	Each week or 70 hours	N/A	Clean, oil-dampened rag
Pedal Arm Shafts	Clean and lubricate	Every 3 months or after 900 hours	Clean, dry rag	30W motor oil
Battery	Check Voltage	Every 3 months or after 900 hours	N/A	N/A
Belts	Inspect & Adjust Tension	Every 3 months or after 900 hours	N/A	N/A

****Note: Use of lubricants other than those specified will result in diminished performance and a shorter life span for that part.***



TROUBLESHOOTING

GENERAL TROUBLESHOOTING GUIDELINES

This troubleshooting section is organized into three basic problem sections: electrical troubleshooting, console diagnostic tests, and mechanical troubleshooting. Once you have identified the problem section, perform all the tests in the same order as written. To order a replacement part or for help with troubleshooting, contact our Customer Service Department. Refer to the Appendix for the appropriate phone number.

ELECTRICAL TROUBLESHOOTING

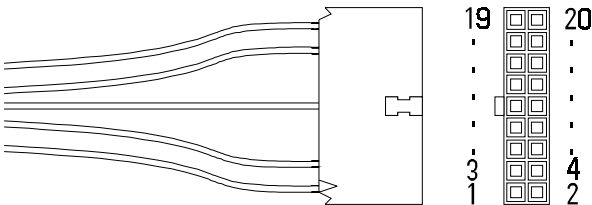
The 4600/4400 PT electrical system has four major components: the alternator, the power supply, the power cables, and the console. The 4600/4400 CL has five major components: the alternator, the power board, the battery, the power cables, and the console. The console, power board, and power supply are not serviceable by the owner. If any of these parts are inoperable, they must be replaced. Opening the console or the power supply will void the warranty.

4600/4400 PT

1. Use a voltmeter set on VAC to verify that the AC wall outlet has 100 to 120 VAC (or 220 to 240 VAC, if applicable). If you do not have a voltmeter plug in an alternate AC-powered device (e.g., a lamp). If the device does not work when plugged into the electrical outlet, consult an electrician for further assistance and then retest the electrical outlet.
2. Plug the power supply into the wall outlet. The green Light Emitting Diode (LED) on the power supply should be on. If the LED does not light up, replace the power supply.
3. Disconnect the DC cable from the left side panel. Set the voltmeter to VDC and test for 12 to 19 VDC in pins #1 (+) and #2 (-). Replace the power supply if the voltage reading is outside the specified range.
4. Remove the bottom cover and connect the DC cable to the power connector on the left side of the frame. Locate the black and white wires on the backside of the power connector.

ELECTRICAL TROUBLESHOOTING

- Follow the white power connector wire to the where it plugs into the main cable white wire, and disconnect it from the main cable white wire.
- Set your voltmeter to VDC. Connect the positive lead of your voltmeter to the white wire from the power connector and touch the gray casing of the alternator with the negative lead of your voltmeter.
- DC voltage measured should be 12 to 19 VDC. Replace the power connector if the voltage is not the same value as in step 3. Connect the two white wires.
- Remove the console knobs from the back of the console, lift the console up, and disconnect the 20-pin main cable from the console.
- Test for 12 to 19 VDC in pins #1 (-) and #10 (+) in the main cable connector. Replace the main cable if the voltage reading is not the same as in step 7.



- If all voltage readings have been within the specified range and the console will not power up, the console should be replaced.

Alternator Test

- Check for loose wiring connections on the alternator, diode, and load resistor (see Final Assembly Figure).
- Perform the Positive Output to Field test on the alternator:
 - Disconnect the power cord from the electrical outlet.
 - Remove the black wire from the B+ terminal on the alternator.
 - Remove the brown wire from the field terminal on the alternator.

ELECTRICAL TROUBLESHOOTING

- Place a short wire with alligator clips on the B+ terminal and the field (FLD) terminal of the alternator.
- Step on the machine for approximately 10 to 15 seconds.
- If full resistance is achieved during this time, your alternator has correct current flow. If no resistance is achieved, replace the alternator.

Diode Test

13. Remove the brown wire and diode from the field terminal of the alternator and set your voltmeter to the Ohms setting.
14. Place one lead from the voltmeter on each end of the diode, and then reverse the leads. A diode that is good will show a high reading in one direction and a low reading when the leads are reversed. Replace the diode if the readings recorded are both high or both low.

Resistor Test

15. Remove one wire from the load resistor (see Final Assembly Figure) and place one lead from the voltmeter on each of the threaded posts on the load resistor. Replace the load resistor if the voltmeter does not read 0.5 Ohms ($\pm 10\%$).

4600/4400 CL

Battery Test

1. Remove the mid cover and top covers and unplug the battery from the power control board. Locate pins #1 & 2 in the end of the cable. Use a voltmeter to verify that the voltage is a minimum of 6.1 VDC. Reconnect the battery back to the power control board and install the battery charger for at least 24 hours if the voltage measured is below 6.1 VDC. Note: You can use the machine while the battery recharger is connected.
2. Remove the console knobs from the back of the console, lift the console up, and disconnect the main cable from the console.

ELECTRICAL TROUBLESHOOTING

3. Step up on the machine. With the voltmeter set to DC voltage, test for greater than 6.1 VDC in pins #1 (+) and #10 (-) in the main cable connector while stepping. Replace the main cable if the voltage reading is less than 6.1 VDC. Next, check for continuity in the main cable (see Final Assembly Figure).
4. If all voltage readings have been within the specified range and the console will not power up, the console should be replaced.

Alternator Test

5. Perform the Positive Output to Field test on the alternator:
 - Unplug the battery from the power control board.
 - Remove the black wire from the B+ terminal on the alternator.
 - Remove the brown wire from the field terminal on the alternator.
 - Place a short wire with alligator clips on the B+ terminal and the field (FLD) terminal of the alternator.
 - Step on the machine for approximately 10 to 15 seconds.
 - If full resistance is achieved during this time, your alternator has correct current flow. If no resistance is achieved, replace the alternator.

Resistor Test

6. Unplug the load resistor from the power control board and set your voltmeter to Ohms. Place one lead from the voltmeter on each of the threaded posts on the load resistor. Replace the load resistor if the voltmeter does not read 2.5 Ohms ($\pm 10\%$).
7. If the problem still exists, contact the Customer Service Department at 800-331-3578.

4600/4400 PT/CL CONSOLE DIAGNOSTIC TESTS

The following tests are performed while the console is in the "SELECT WORKOUT" mode. If the console fails any test, the console should be replaced or exchanged. To return to the "SELECT WORKOUT" mode, press either [CLEAR] or [START/STOP] while in the DIAGNOSTIC mode. Please note that there may be additional verbiage on the display other than is listed in this manual. The FreeClimber console is used on other StairMaster® equipment.

DIAGNOSTIC CODES

- [^][6][0] Test display
- [^][6][1] Test keyboard
- [^][6][2] Test serial port
- [^][6][3] Test alternator
- [^][6][4] -N/A-
- [^][6][5] -N/A-
- [^][6][6] Test Tach
- [^][6][7] - [6][9] -N/A-

Display Test

During the display test, the console screen alternates between all LCD segments turned on and the sample program profile screen at a 2-second rate.

1. Press [LEVEL: ^], [6], [0], [ENTER]. The console will display "DISPLAY TEST".
2. All LCD segments will turn on for 2 seconds, and then a sample program profile will be displayed for 2 seconds. Press [CLEAR] to end the test.

Keypad Test

Perform this test if you are having trouble entering data into the console. During the test, pressing any key displays that key name on the message line. Press [CLEAR] to exit.

4600/4400 PT/CL CONSOLE DIAGNOSTIC TESTS

1. Press [LEVEL: ^], [6], [1], to start the test.
2. Firmly press each button except [CLEAR]. The name of the key will be shown in the display window. Press [CLEAR] to end the test.

Serial Port Test

This test verifies that the RS 232 port used for linking to external C.S.A.F.E. systems (commercial entertainment systems) is working. You must have the loop-back cable assembly (PN 040051-001) to perform this test.

1. Insert the loop-back cable assembly into the RS 232 port on the back of the console.
2. Press [LEVEL: ^], [6], [2]. The console will display "SERIAL TESTS." Press [ENTER] to access the C.S.A.F.E. test.
3. Press [ENTER] a second time. The console will run a diagnostic test and then display either "PASS" or "FAIL." Replace the console if it fails this test.

Alternator Test

Use this test to verify the alternator field routines of the console. You will need to briefly exercise on the machine for this test.

1. Press [LEVEL: ^], [6], [3], to start the test.
2. For "Field on" press [LEVEL: ^]. Step on the machine for approximately 10 to 15 seconds. If full resistance is achieved during this time, your console has correct current flow. If no resistance is achieved, either the console or the alternator is bad. See the electrical troubleshooting portion of this manual to isolate and test the alternator. Replace the console if the alternator is good.
3. For "Field off" press [LEVEL: V]. Step on the machine for approximately 10 to 15 seconds. You should not get resistance with the field turned off. Press [CLEAR] to end the test.

4600/4400 PT/CL CONSOLE DIAGNOSTIC TESTS

Tach Test

If you do not have resistance, perform the tach test. The tach test will tell you the tach signal, in revolutions per minute (RPMs), picked up by the console.

1. Press [LEVEL: ^], [6], [6], [ENTER]. The console will display "TAR TACH ACT." The target tach speed of 2,000 RPMs will be shown in the upper left corner of the display window. The actual tach picked up by the console will be shown in the upper right corner of the display window.
2. Start stepping on the pedals. The number in the right hand corner of the console should increase to 2,000 RPMs (+/- 200). If the tach signal picked up by the console is less then 1,900 RPMs then there is a problem in the AC tach circuit - either with the console software, alternator (check the AC tach wire, the field wire, the diode, and the terminal posts), or the main cable.

Error Reporting

The console will display various error messages in the display window. The total amount of errors will be displayed in the upper right numeric window. Note that only the highest priority reported error will be displayed. Errors are handled in two ways. One as a non-fatal "WARNING" which will display the text message but continue system operation until the user presses the [CLEAR] key. The second way is as a fatal "ERROR" which will stop the exercise and return the system to an idle intensity state. The console will display the error text and not let the user restart the programs unless power has been turned off and then back on.

The following microprocessor errors require a console replacement; ALU ERROR, TIMER ERROR, and STATIC RAM ERROR.

Resetting the power may clear the following microprocessor errors; EEPROM ERROR, and PROGRAM ERROR. If resetting the power doesn't work, the console may need to be replaced.

4600/4400 PT/CL CONSOLE DIAGNOSTIC TESTS

Contact Heart Rate Test

The contact heart rate system is made up of the console and the contact heart rate sensor handles. Remember that even when operating properly, the contact Heart Rate system will not work for everyone. If you suspect you have a problem with your system, have someone else try it before performing the following troubleshooting steps:

1. With the console showing "SELECT WORKOUT," place your hands on the sensor handles using a relaxed grip, and remain still. After approximately 10 seconds a flashing ♥ should be displayed on the console, followed by your heart rate in beats per minute. If your heart rate does not appear, continue on to the next step.
2. Verify that the console software has been set up to receive contact heart rate (see the heart rate monitoring section of this manual).
3. If the telemetry (Polar®) receiver located in the console is receiving interfering signals, the contact heart rate system may be inhibited. Take your hands off the handle sensors for about 20 seconds and watch the heart display. If it flashes on and off, the telemetry heart rate is picking up interfering signals, and the machine must be moved away from the source of the interference or the telemetry heart rate input must be disabled (see the heart rate monitoring section of this manual).
4. Remove the console knobs from the back of the console, lift the console up, and disconnect both the main cable and the small hand grip sensor cable from the console. Use an ohmmeter to check for continuity between the hand grip sensors and the small cable connector. If the handles are working, each steel sensor should be connected to one wire on the cable connector, with less than 15 ohms showing on the ohmmeter.
5. If possible, replace or exchange your console with a console that you know is working and retest the machine.
6. If the problem still persists, contact the Customer Service Department at 800-331-3578.

4600/4400 PT/CL CONSOLE DIAGNOSTIC TESTS

Telemetry (Polar®) Heart Rate Test

The telemetry heart rate system is made up of the console, the heart rate receiver, and the chest strap (available separately). You can test each component by performing the following steps:

1. You will need to put a chest strap on to test the telemetry heart rate. Before you put on the chest strap, wet the two contact patches. Secure the chest strap as high under your pectoral muscles (chest) as is comfortable. The chest strap should fit snugly, comfortably, and allow normal breathing.
2. A flashing ♥ should be displayed on the console. Your heart rate, in beats per minute, will show next to the heart icon. If the heart icon does not show, or if your heart rate is not displayed on the console, then you have a problem with either the console, chest strap, or heart rate receiver.
3. Verify that the console software has been set up to receive telemetry (see the heart rate monitoring section of this manual). Note that holding the contact heart rate sensors (if enabled) can inhibit the telemetry heart rate input from working.
4. Test your chest strap with a machine that you know is working or with a heart rate watch that you know is working.
5. External interference caused by nearby televisions, personal CD players, or air conditioners may also inhibit the telemetry heart rate pickup. Move the machine away from interference sources if possible.
6. If possible, replace or exchange your console with a console that you know is working and retest the machine.

MECHANICAL TROUBLESHOOTING

If you hear a grinding or clicking noise, experience excessive vibration during exercise, or if the pedals are not functioning properly, you probably have a problem in the drive train. Attempt to isolate the problem area by performing the following tests in precisely the order listed below. Refer to the "Parts Removal and Replacement" section for all disassembly and assembly instructions.

1. Unplug the machine and remove the bottom side covers.



WARNING

TO REDUCE THE RISK OF INJURY, DO NOT OPERATE THE MACHINE WHILE THE COVERS ARE REMOVED. DO NOT DEPRESS OR RAISE THE PEDALS WHILE ANYONE'S HANDS ARE INSIDE THE MACHINE.

2. Noise can be generated by a Poly-V or HTD belt that is either too tight or too loose. Check the condition and the tension of the belts. Replace worn belts. Adjust the belt tension according to the instructions in the "Parts Removal and Replacement" section.
3. Remove the Poly-V belt and move the pedal arms. If the noise no longer exists, check the condition of the alternator. If the noise is still present, go to step #4.
 - Disconnect the DC power cable if you have a 4600/4400/4200 PT or unplug the connector from position J4 on the power supply circuit board if you have a 4600/4400 CL. Spin the alternator pulley with your fingers. It should spin freely and remain spinning for at least two revolutions. If it does not, the alternator should be replaced.
 - If the alternator does spin freely, check the alternator for noise, roughness, or the presence of an excessive amount of black powder inside the alternator or near the outside of the case. If any of these conditions exist, the brushes might be bad and the alternator should be replaced.

MECHANICAL TROUBLESHOOTING

- Do not reinstall the Poly-V belt if performing step #4. Plug in the connector at position J4 or reconnect the DC power cable, as applicable.
4. Remove the drive and step chains. Check the condition of the chains by flexing each link up and down. Each link should move freely. Replace the chain if any stiff or inflexible links are found or if the chain is rusty, corroded, or otherwise damaged. Do not reinstall the chains.
 5. Remove the pedals. Clean any corrosion off the pedal shaft with an oil-dampened rag. Apply a thin coat of multi-purpose grease to the shaft. If the noise persists, go to step 6.
 6. Check the step chain connection point. Clean and grease the master link and bushing. Replace damaged parts.
 7. Check the drive hub assembly.
 - Check the condition of the drive sprocket teeth. The teeth should not be unevenly worn. Replace the worn sprocket(s).
 - The drive sprockets work independently of one another. Each sprocket should turn freely in one direction and lock when turned in the other direction. Replace an inoperable drive sprocket.
 - Remove the drive shaft. Inspect the bearings in the drive hub. Replace the drive hub assembly if the shaft does not spin freely or if there is excessive radial play at the shaft. Be careful not to get dirt into the hub.
 - Inspect the ends of the drive shaft (at the sprocket attachment points) for signs of wear or scoring. Replace the shaft if it is excessively worn.
 8. Check the pedal arm and leveling arm shafts by removing both the right and left pedal and leveling arms. Inspect the shafts and the bushings for signs of wear and corrosion. Replace the bushing(s) if worn.



MECHANICAL TROUBLESHOOTING

- Clean all corrosion off the pedal arm shaft and leveling arm shaft and bushings. Wipe the shafts with an oil-dampened cloth before reassembling. **DO NOT SAND THE PEDAL ARM SHAFT OR LEVELING ARM SHAFT.**
9. Remove the HTD belt. Inspect the belt, the Poly-V pulley, and the HTD pulley for excessive wear. Replace if necessary. The Poly-V pulley should spin freely. If it does not, replace the eccentric shaft assembly.
 10. Inspect the HTD pulley for excessive wear and smoothness of operation. If the pulley is worn, replace it. If it does not spin freely, remove the first reduction shaft and inspect the bearings.
 11. Reinstall all parts, ensuring the proper tension of the Poly-V and HTD belts and the drive chain (see Figure 30). Clean and lubricate the drive and step chains with 30W motor oil before reinstalling them.

PARTS REMOVAL AND REPLACEMENT

COVERS



WARNING

TO REDUCE THE RISK OF INJURY, DO NOT OPERATE THE MACHINE WHILE THE COVERS ARE REMOVED. DO NOT DEPRESS OR RAISE THE PEDALS WHILE ANYONE'S HANDS ARE INSIDE THE MACHINE.

There are three covers on the 4400 PT/CL and the 4200 PT: the top cover, the mid-cover and the bottom cover. The top and bottom covers are made of a right and left section. Do not separate the right and left sections of either the top or bottom covers to perform most maintenance tasks. Access to the interior of the machine takes three steps: remove the mid cover, slide the top cover upward, and remove the bottom cover (see Figure 24).

The 4600 PT/CL has an additional shield over the handles. Access to the interior of the machine takes four steps: remove the mid cover, remove the shield, separate the top covers, and remove the bottom cover.

Mid Cover

1. Use the fastener removal tool to remove each of the four fastener pins on the mid cover (see Figure 23).
2. Stand on the pedals and keep them on the floor.
3. Slide the mid cover down and away from the machine. Remove the cover from the frame tube. Carefully let both pedals return to the upper stops.

Top Cover

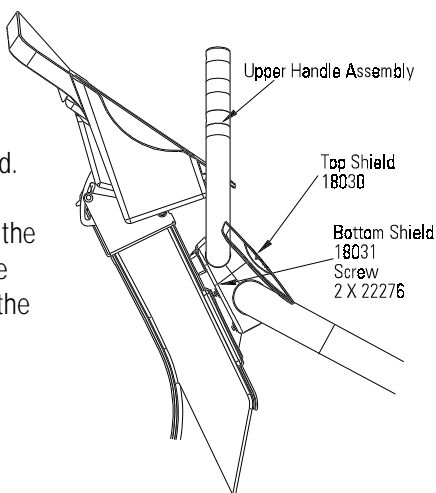
1. **4400 PT/CL, 4200PT:** Remove the mid cover and the console.
2. Release the pins along the middle seam of the top cover. Use a small phillips screwdriver or similar tool to push the fastener center pin in at least halfway. Use your fingers to remove the fastener base from the cover and then separate the top covers.

PARTS REMOVAL AND REPLACEMENT

3. **4600 PT/CL:** Use the fastener removal tool to release the cover fasteners and separate the top covers.
4. To reinstall the 4400 PT/CL and 4200 PT fasteners, remove the pin completely from the base. Insert the base into the hole in the covers. Insert the pin into the base until it is flush with the base.

Shield (4600 PT/CL)

1. Remove the two mounting screws from the bottom shield.
2. Separate the top shield from the bottom shield and remove the upper and lower shield from the handrail.



Bottom Cover

1. Remove the mid cover.
 2. **4600/4200/4400 PT:** Disconnect the DC power cable from the connector located on the bottom side of the left bottom cover.
 3. Remove the fastener located on each side of the lower edge of the bottom cover (see Figure 24).
 4. **4400/PT/CL, 4200 PT:** Kneel in front of the machine, facing the cover seam. Push in and hold both sides of the lower cover to disengage the locking tabs at the joint between the upper and lower covers. Use your hands to push up the top cover and separate the top cover from the bottom cover. Pull out and forward on the lower cover to remove it from the frame.
- 4600 PT/CL:** Remove the cover fasteners and separate the left and right top cover from each other. Pull out and forward on the lower cover to remove it from the frame.

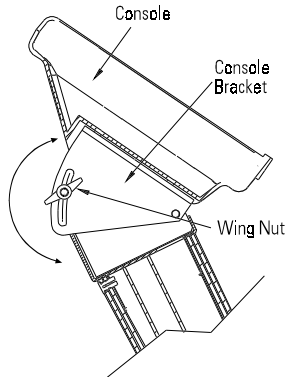
PARTS REMOVAL AND REPLACEMENT

CONSOLE

1. Remove the four mounting knobs from the back of the console.
2. Disconnect the main cable, contact heart rate cables (4600 PT/CL), and Polar® cable (4600/4400 PT/CL) from the back of the console. Lift the console off the machine.
3. Reverse the steps to reinstall the console.

CONSOLE ADJUSTMENT

1. Loosen the console bracket wing nut.
2. Pivot the console up or down to adjust the console to desired viewing angle and then tighten the wing nut.



POLY-V AND HTD BELT



WARNING

THE BELTS MUST BE PROPERLY TENSIONED. A BELT THAT IS TOO TIGHT WILL CAUSE SLOW AND SLUGGISH OPERATION. A BELT THAT IS TOO LOOSE WILL CAUSE EXCESSIVE NOISE AND BELT WEAR.

1. Remove the bottom cover.
2. Loosen the adjustment bolt that mounts the alternator to the slotted alternator brace and the pivot adjusting bolt and nut. Swing the alternator down.
3. Remove the Poly-V belt.
4. Slide the HTD belt toward you and off the HTD pulley. Remove the belt from the machine.
5. Reinstall the HTD belt.

PARTS REMOVAL AND REPLACEMENT

- Adjust the HTD belt tension so that you have 1/4 inch (0.6 cm) of side-to-side play with fingertip pressure (see Figure 30). The bottom shaft is mounted in an eccentric hub. To adjust the tension:
 - Loosen and remove the four bolts and nyloc nuts from the hub.
 - Turn the hub one hole clockwise.
 - Install and tighten the four bolts and nyloc nuts.
 - Verify the HTD belt tension.
- Install the Poly-V belt. Make sure it is centered on the pulleys.
- Pivot the alternator up or down as necessary to allow 1/4" (0.6 cm) of belt deflection with fingertip pressure at the center of the vertical portion of either side of the belt (see Figure 30).
- Tighten the alternator adjustment bolt. Verify 1/4" (0.6 cm) of play in the belt and reinstall the bottom cover.

STEP CHAIN RETAINER

- Remove the bottom cover.
- Loosen and remove the two step chain retainer bolts. These bolts are also the top two mounting bolts for the drive hub assembly.
- Reverse the removal procedures to install the step chain retainer. Make sure there is adequate clearance between the step chain and the step chain retainer.

PEDAL ARM RETURN SPRING

- Remove the bottom cover.
- Unhook the pedal arm return spring from the spring hanger.
- Detach the spring from the step chain by removing the master link. The spring-chain connector is in good condition if it has an hour glass shape. Replace a worn spring-chain connector.

PARTS REMOVAL AND REPLACEMENT

4. Check to ensure that the spring pulley turns freely and is not worn excessively. Refer to the "Spring Pulley" section if you have to replace the pulley.
5. To reinstall the spring, connect it to the end of the step chain using the master link.
6. Route the spring under the spring pulley that is fastened to the spring pulley shaft (see Figure 11).
7. Hook the end of the pedal arm return spring onto the spring hanger.



WARNING

DO NOT TWIST THE SPRING DURING INSTALLATION. IT WILL WEAR EXCESSIVELY AND REDUCE THE LIFE OF THE SPRING.

8. Reinstall the covers.

STEP CHAIN

1. Remove the bottom cover.
2. Remove the step chain retainers.
3. Support the pedal arm. Unhook the pedal arm return spring from the spring hanger. Lift the step chain up and off the clutch sprocket and lower the pedal arm to the floor.
4. Remove the double-pitch master link (PN 21298SV) and bearing sleeve assembly from the step chain connection point on the pedal arm.
5. Remove the master link from the spring-chain connection.
6. Reverse the procedures to reinstall the step chain. Lubricate the step chain before reinstalling the covers.

PARTS REMOVAL AND REPLACEMENT

SPRING PULLEY

1. Remove the bottom cover.
2. Unhook the pedal arm return spring from the spring hanger.
3. Remove the snap ring from the pulley shaft (see Figure 11).



WARNING

TO REDUCE THE RISK OF EYE INJURY, WEAR EYE PROTECTION WHEN REMOVING SNAP RINGS.

4. Slide the pulley and washer off the shaft.
5. Before reinstalling the pulley, clean the pulley shaft thoroughly with a clean, dry cloth. Apply a thin coat of multi-purpose grease to the pulley shaft.
6. Slide the pulley and washer onto the shaft. Install the snap ring.
7. Route the spring under the spring pulley.
8. Hook the end of the spring over the spring hanger. Do not twist the spring.



WARNING

DO NOT TWIST THE SPRING DURING INSTALLATION. IT WILL WEAR EXCESSIVELY AND REDUCE THE LIFE OF THE SPRING.

9. Reinstall the covers.

DRIVE CHAIN

1. Remove the bottom cover.

PARTS REMOVAL AND REPLACEMENT

2. Remove the master link from the drive chain.
3. Remove the drive chain from the sprockets.
4. Reinstall the drive chain, ensuring the master link is properly installed.
5. Check the drive chain tension. There should be a total of 1 to 1-1/2" (2.5 to 4.0 cm) of play, up and down, at the slackest point in the chain (see Figure 27). If the drive chain tension needs adjustment, refer to the "Drive Hub Assembly" section.



WARNING

IF THE DRIVE CHAIN IS TOO TIGHT, THE DRIVE TRAIN WILL WEAR EXCESSIVELY, SHORTENING THE LIFE OF THE DRIVE HUB. IF THE CHAIN IS TOO LOOSE, THE MACHINE WILL BE NOISY AND WILL OPERATE AT LESS THAN PEAK EFFICIENCY.

6. Lubricate the chain with 30W motor oil and wipe off the excess.
7. Reinstall the covers.

DRIVE SHAFT ASSEMBLY

1. Remove the bottom cover.
2. Remove the step chain retainers.
3. Support the pedal arm. Unhook the pedal arm return spring from the spring hanger. Lift the step chain up and off the clutch sprocket and lower the pedal arm to the floor. Repeat on the other side.
4. Remove the snap ring from the left end of the drive shaft.



WARNING

TO REDUCE THE RISK OF EYE INJURY, WEAR EYE PROTECTION WHEN REMOVING SNAP RINGS.

PARTS REMOVAL AND REPLACEMENT

5. Remove the drive chain.
6. Remove the sprocket and the other small parts from the left side of the hub assembly (see Figure 18).
7. Slide the drive shaft to the right, out of the hub assembly. If you remove the right-hand clutch sprocket from the drive shaft, do not confuse it with the left-hand clutch sprocket.
8. Loosen and remove the two remaining bolts and nuts that hold the hub assembly to the frame. Remove the hub assembly.
9. Inspect the drive shaft, the bushings, the thrust washers, and clutch sprockets for excessive wear or pitting. Replace worn-out components.
10. To reinstall the hub assembly, carefully reverse the disassembly procedures. Be sure that the right- and left-hand clutch sprockets are positioned correctly; the wide shoulder of the sprocket should be facing away from the hub on both sides.
11. **Chain Tension.** The drive shaft is mounted in an eccentric hub. Rotate the hub so the marked hole is in the 12 o'clock position, lining up four holes in the hub with the four holes in the frame. Use this hub position when reinstalling the drive chain since the distance between the drive and transmission shafts is at a minimum. The hub is in the proper position when the drive chain has a total of 1 to 1-1/2" (2.5 to 4.0 cm) of play at the slackest point. As the drive chain stretches with use, increase the chain tension (and the distance between the two shafts) by rotating the hub counterclockwise (see Figure 26). The distance between the two shafts is greatest when the marked hole in the hub is at the 8 o'clock position.
12. Reinstall the covers.

PARTS REMOVAL AND REPLACEMENT

PEDAL

1. Remove the snap ring and flat washer from the leveling arm pin and the pedal shaft (see Figure 17).



WARNING

TO REDUCE THE RISK OF EYE INJURY, WEAR EYE PROTECTION WHEN REMOVING SNAP RINGS.

2. Slide the pedal off the shaft.
3. Clean the pedal shaft and leveling arm pin with a dry cloth. Lubricate the pedal shaft and the leveling arm pin with a thin coat of multi-purpose grease.
4. Reverse the procedures to reinstall the pedal.

LEVELING ARM

1. Remove the pedal.
2. Remove the bottom cover.
3. Remove the snap ring that secures the leveling arm to the leveling arm shaft (see Figure 19).



WARNING

TO REDUCE THE RISK OF EYE INJURY, WEAR EYE PROTECTION WHEN REMOVING SNAP RINGS.

4. Slide or gently tap the leveling arm off the shaft.
5. Clean the shaft and the pin with a cloth dampened with 30W motor oil before reassembly.
6. Reverse the removal instructions to reinstall the leveling arm.

PARTS REMOVAL AND REPLACEMENT

PEDAL ARM

1. Remove the pedal and the bottom cover.
2. Remove the step chain retainers.
3. Support the pedal arm. Unhook the pedal arm return spring from the spring hanger. Lift the step chain up and off the clutch sprocket and lower the pedal arm to the floor.
4. Remove the master link from the step chain connection point.
5. Remove the snap ring from the pedal arm mounting shaft and the leveling arm pin.



WARNING

TO REDUCE THE RISK OF EYE INJURY, WEAR EYE PROTECTION WHEN REMOVING SNAP RINGS.

6. Slide or gently tap the pedal arm off the mounting shaft.
7. Clean the pedal arm shaft and leveling arm pin with a cloth dampened with 30W motor oil before reassembly.
8. Reverse the removal procedures to reinstall the pedal arm.

PEDAL PAD

1. The pedal pad wraps around the pedal and locks into place under the pedal. Separate the pedal pad from the pedal by grabbing the bottom of the pedal and pulling down and out.
2. Lift the other side of the pedal pad up and remove the pedal pad from the pedal.

Note: There is a right and left pedal pad. Do not install a left pedal pad on a right pedal, or a right pedal pad on a left pedal.



PARTS REMOVAL AND REPLACEMENT

ECCENTRIC HUB ASSEMBLY

1. Remove the bottom cover.
2. Remove the Poly-V and HTD belts.
3. Loosen and remove the four nyloc nuts and bolts from the hub. Remove the assembly from the frame.
4. Reassemble in the reverse order. Ensure the belts are properly tensioned; refer to the "Poly-V and HTD belt" section.

FIRST REDUCTION SHAFT ASSEMBLY

1. Remove the bottom cover.
2. Remove the drive chain.
3. Remove the eccentric shaft assembly.
4. Remove the set screw from the transmission sprocket (see Figure 21). Remove the sprocket and key from the shaft.
5. Hold onto the HTD sprocket and pull the shaft out of the hub.
6. Reassemble in the reverse order. Ensure the belts are properly tensioned; refer to the "Poly-V and HTD belt" section.

HANDLEBAR (4400 PT/CL ,4200 PT)

1. Remove the console and separate the left and right top cover.
2. Cut the Ty-wraps that secure the main cable to the handlebar tube.
3. Remove the four screws and flat washers that hold the handlebar tube in the frame tube.
4. Lift the handlebar out of the frame. Reverse the steps to reinstall the handlebars.

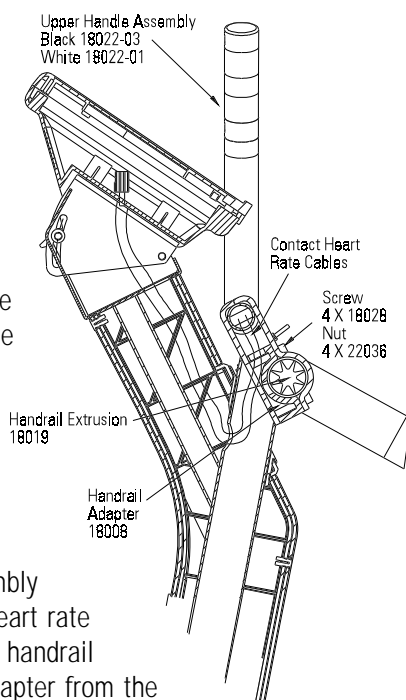
PARTS REMOVAL AND REPLACEMENT

UPPER HANDLES (4600 PT/CL)

1. Disconnect the left and right contact heart rate cables from the back of the console.
2. Remove the two mounting screws from the top and bottom shield and remove the shields from the upper handle assembly.
3. Remove the four handrail adapter screws from the upper handle assembly.
4. Remove the upper handle assembly from the machine. The contact heart rate cables are threaded through the handrail adapter. Remove the handrail adapter from the contact heart rate cables.
5. Reverse the removal procedures to install the new upper handle assembly.

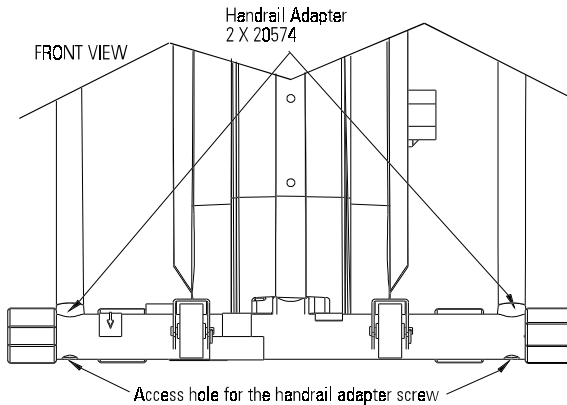
SIDE HANDRAILS (4600 PT/CL)

1. Disconnect the left and right contact heart rate cables from the back of the console.
2. Remove the two mounting screws from the top and bottom shield (see Figure 20) and remove the shields from the upper handle assembly.
3. Remove the four handrail adapter screws from the upper handle assembly.
4. Remove the upper handle assembly from the machine. The contact heart rate cables are threaded through the handrail adapter. Remove the handrail adapter from the contact heart rate cables. Set the upper handle assembly aside.



PARTS REMOVAL AND REPLACEMENT

5. Tilt the machine forward and use an extended socket to remove the two handrail adapter screws from the front leg of the machine.



6. Tilt the machine back into place and pull each handrail out sideways. Be aware that the handrail extrusion connects the left handrail to the right handrail, and may fall out when one side is removed.
7. Reverse the removal procedures to reinstall the handrail.

ALTERNATOR

1. Remove the bottom cover. Mark (by color) the location of each wire attached to the alternator (see Final Assembly Diagram). Remove the wires from the alternator.
2. Loosen and remove the alternator adjusting bolt on the slotted brace. Remove the Poly-V belt. Inspect the belt for wear and replace the belt if it is cracked, cut, or is otherwise damaged.
3. Loosen and remove the nyloc nut from the alternator post. Remove the alternator from the frame.
4. Reverse the removal procedures to install the new alternator. Be sure to verify the wiring against the Final Assembly Diagram.
5. Pivot the alternator up or down as necessary to allow 1/4" (0.6 cm) of belt deflection with finger tip pressure at the center of the vertical portion of either side of the belt (see Figure 27).

GROUNDING INSTRUCTIONS

The machine must be grounded if you are using the external power supply or the battery charger. Grounding provides the path of least resistance for the electric current, thereby reducing the risk of electric shock. The power supply or battery charger must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.



DANGER

IMPROPER CONNECTION OF THE EQUIPMENT-GROUNDING CONNECTOR CAN RESULT IN THE RISK OF ELECTRIC SHOCK. CHECK WITH A QUALIFIED ELECTRICIAN OR SERVICE PERSON IF YOU ARE IN DOUBT AS TO WHETHER THE MACHINE IS PROPERLY GROUNDING. DO NOT MODIFY THE PLUG PROVIDED WITH THIS MACHINE. IF IT WILL NOT FIT THE AVAILABLE OUTLET, HAVE A PROPER OUTLET INSTALLED BY A QUALIFIED ELECTRICIAN.

The grounding plug on the power supply and the battery charger is shown in sketch A below*. A temporary adapter, shown in sketches B and C, may be used to connect the plug to a two-pole receptacle if a properly grounded outlet is not available. The adapter should be used only until a properly grounded outlet (sketch A) can be installed by a qualified electrician. The tab extending from the adapter must be connected to a permanent ground such as the metal screw on the outlet cover.

* This may vary for International power supplies.

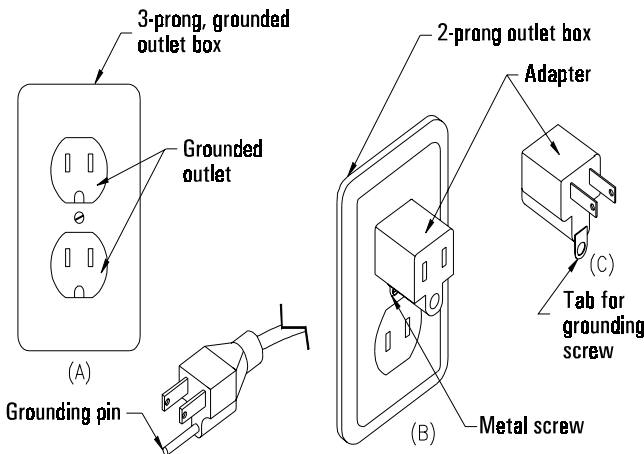


Figure 10: Grounding System

FCC COMPLIANCE

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

CHANGES OR MODIFICATIONS TO EQUIPMENT NOT EXPRESSLY APPROVED BY STAIRMASTER® HEALTH & FITNESS PRODUCTS, INC. COULD VOID THE USER'S AUTHORITY TO OPERATE THIS EQUIPMENT.

CANADIAN DOC CLASS B COMPLIANCE

This digital apparatus does not exceed the Class B limits for radio emissions from digital apparatus set out in the radio interference regulations of the Canadian Department of Communications.

La présent appareil numérique ne dépasse pas les limites établies pour les bruits radioélectriques applicables aux appareils numériques de la Class B prescrites dans les règlement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

If you need assistance, please have both the serial number of your machine and the date of purchase available when you contact the appropriate StairMaster® Health & Fitness Products, Inc. office listed below.

OFFICES IN THE UNITED STATES

CORPORATE HEADQUARTERS

12421 Willows Road NE, Suite 100
Kirkland, WA 98034
(800) 635-2936 or (425) 823-1825
FAX: (425) 823-9490
www.stairmaster.com

CUSTOMER SERVICE

12421 Willows Road NE, Suite 100
Kirkland, WA 98034
(800) 331-3578
FAX: (425) 814-0601
E-mail: customerservice@
stairmaster.com

INTERNATIONAL OFFICES AND DISTRIBUTORS

For technical assistance and a list of distributors in your area, please call or fax one of the following numbers.

INTERNATIONAL DIVISION

(425) 823-1825
FAX: (425) 820-7505
E-Mail: intlservice@stairmaster.com

ASIA PACIFIC HEADQUARTERS

Telephone/Fax: +81-45-590-5686
E-mail: stairintl@aol.com

EUROPE: HEADQUARTERS

+41-91-827-3801
FAX: +41-91-827-8902
E-Mail: stairmasterch@swissonline.ch

GERMANY: HEADQUARTERS

+49-2204/610-27
FAX: +49-2204/628-90
E-Mail: stairmaster.de@t-online.de

U.K.: HEADQUARTERS

+44-1908/267-345
FAX: 44-1908/267-346
E-mail: stairmasteruk@msn.com

APPENDICES

BATTERY RECYCLING

After installing a new battery, Contact the nearest Yuasa-Exide, Inc. recycling center from the list below to get information on the proper disposal of your old lead-acid battery. Most federal and state regulations require lead-acid batteries be recycled. Do not throw away old batteries. Lead is a heavy metal and is toxic to living organisms.

STATE	ADDRESS	PHONE NUMBER
Alabama	906 40th St. Birmingham, AL 35222	(205) 591-0606
California, (Northern)	3470 Depot Rd. Hayward, CA 94545	(510) 887-8080
California, (Southern)	1250 Bixby Dr. City of Industry, CA 91745	(818) 333-3060
Colorado	12860 W. Cedar Dr. Suite 106A Lakewood, CO 80228	(303) 763-5833
Florida	11310 Satellite Blvd. Orlando, FL 32821	(407) 857-9234
Georgia	1721-C Oakbrook Dr. NE Norcross, GA 30093	(404) 446-8663
Illinois	5303 Ninth Ave Countryside, IL 60525	(708) 352-3665
Maryland	899 Airport Rd. Ste E Glen Burnie, MD 21061	(410) 768-5586
Massachusetts	13 Wheeling Ave. Woburn, MA 01801	(617) 932-6570
Michigan, Southeast	2760 Auburn Rd. Auburn Hills, MI 48326	(616) 531-1120
Michigan, West	2882 Remico St. SW Grandville, MI 49418	(612) 631-2150
Minnesota	1900 Oakcrest Ave. Ste 5 Roseville, MN 55113	(816) 231-1414
Missouri	5328 Winner Rd. Kansas City, MO 64127	(816) 231-0685
New Hampshire	17 Clinton Dr. Hollis, NH 03049	(603) 886-5900

APPENDICES

STATE	ADDRESS	PHONE NUMBER
New Jersey	131 Industrial Ave. Hasbrouck Hgts., NJ 07604	(201) 641-5900
New York	26 Corporate Circle E. Syracuse, NY 13057	(315) 437-1788
Ohio, Central	Rickenbacker ANG Bldg. 1073 Columbus, OH 43217	(513) 851-3838
Ohio, North	2635 Hamilton Ave. Cleveland, OH 44114	(216) 241-6231
Ohio, Southwest	540 Northland Blvd. Cincinnati, OH 45240	(216) 241-6231
Pennsylvania, East	3000 Montrose Ave. Laureldale, PA 19605	(215) 921-4480
Pennsylvania, East	320 Constance Dr. Warminster, PA 18974	(215) 443-0912
Pennsylvania, West	920 Vista Park Rd. Pittsburgh, PA 15205	(412) 788-1613
Tennessee	2934 Brooks Road Memphis, TN 38116	(901) 396-5031
Texas, Northeast	11420 Ferrell Dr. Ste 300 Dallas, TX 75234	(214) 869-1855
Texas, South	4738 Cotton Belt San Antonio, TX 78219	(210) 661-5497
Texas, Southeast	4301 S. Pinemont Ste 114 Houston, TX 77041	(713) 690-8700
Washington	660 Industry Dr. Tukwila, WA 98188	(425) 575-3090
West Virginia	P.O. Box 1666 Rte. 2, Box 1 Bluefield, WV 24701	(304) 327-3594

APPENDICES

Figure 11: Parts Needing Periodic Maintenance

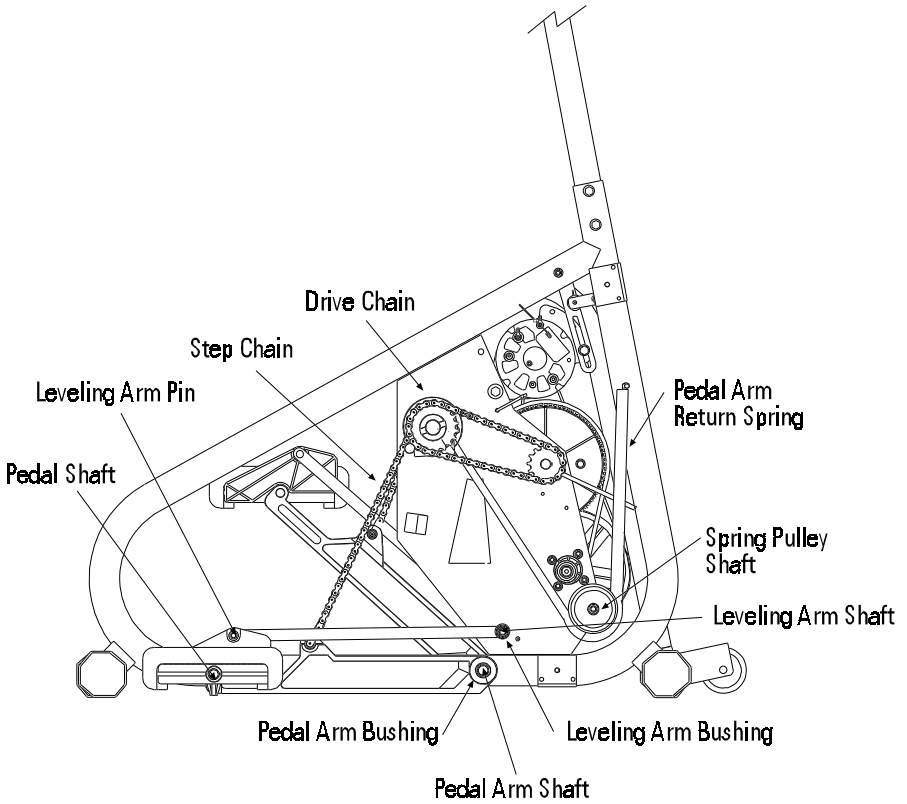
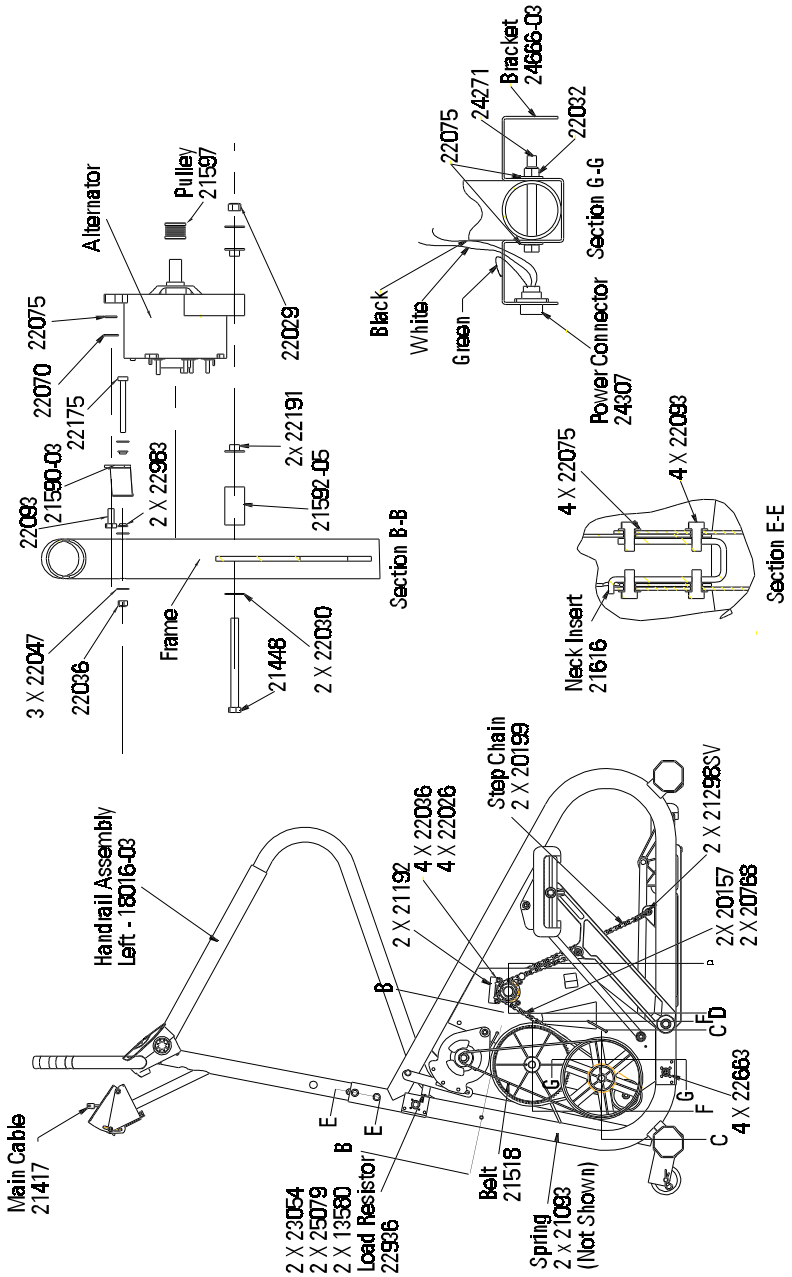


Figure 12: Final Assembly - Left, 4600 PT



APPENDICES

Figure 13: Final Assembly - Right, 4600 PT

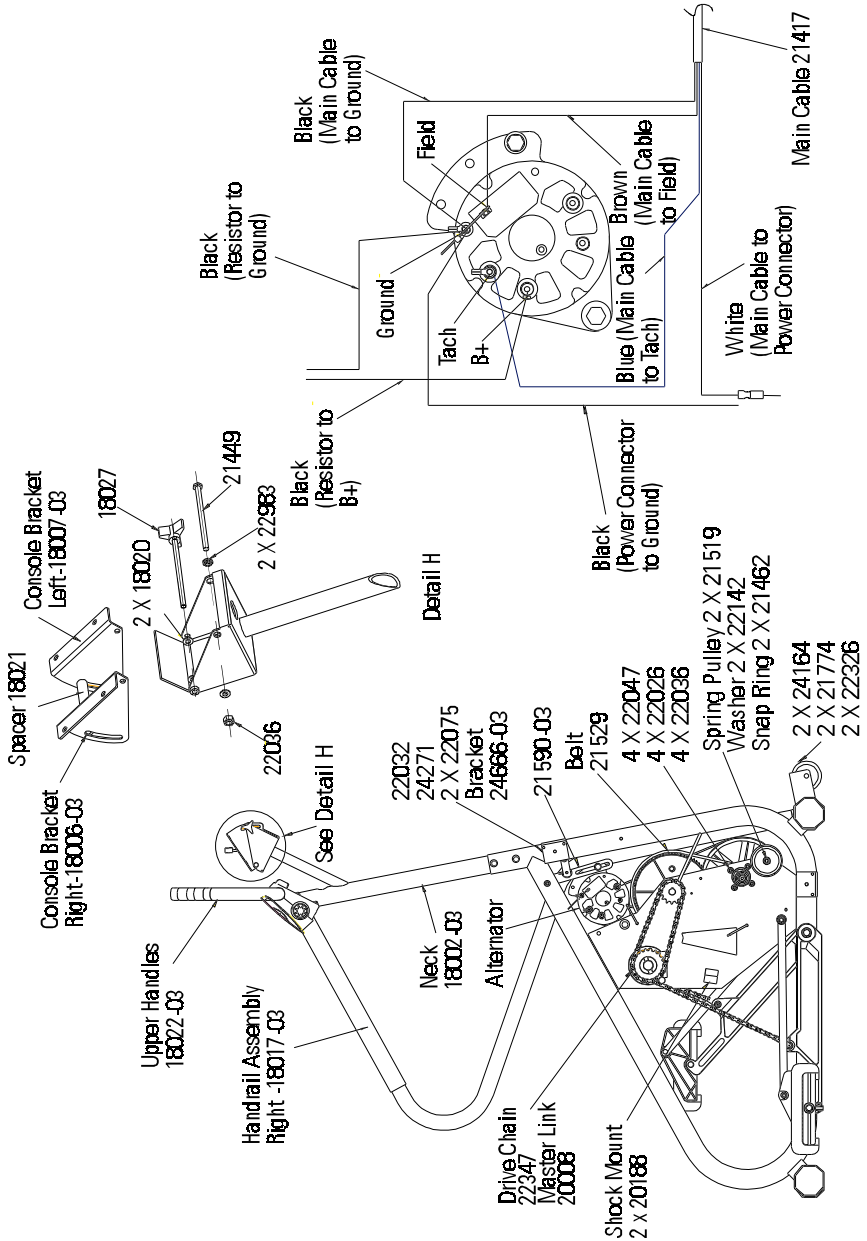


Figure 14: Final Assembly - Left, 4600 CL

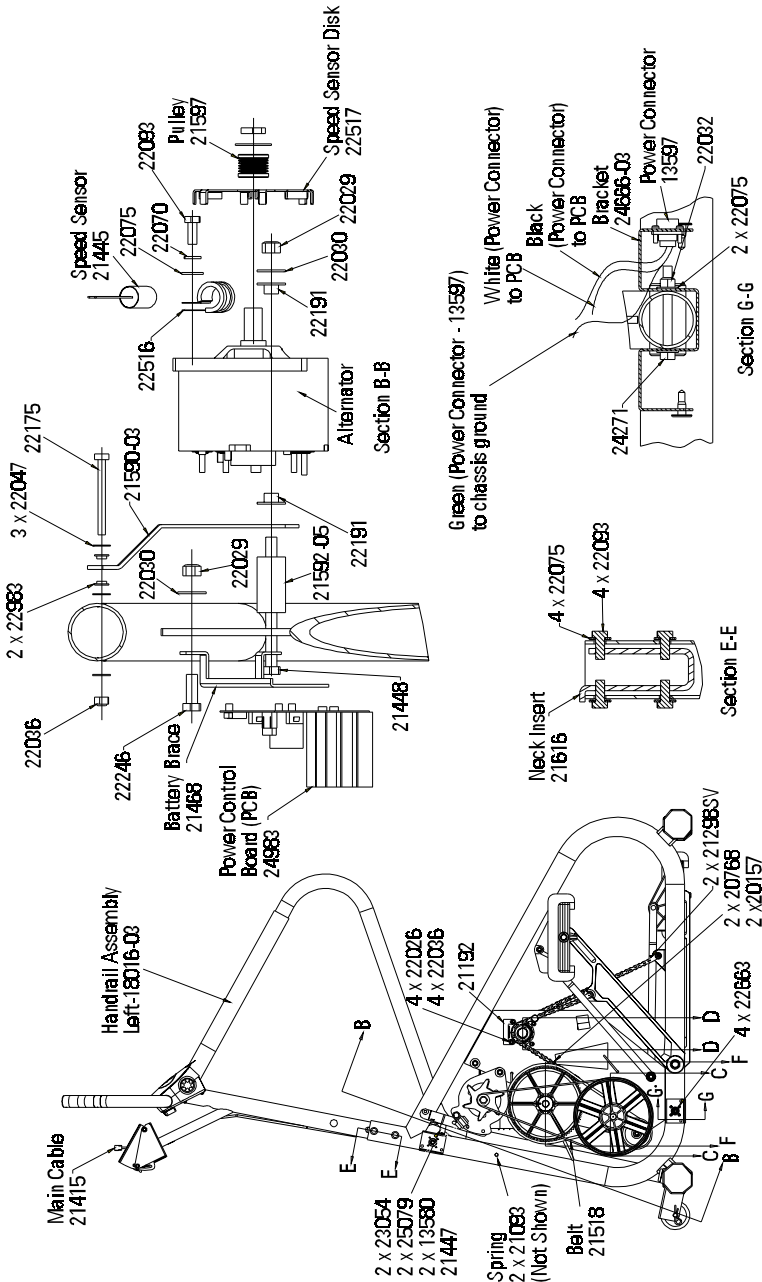
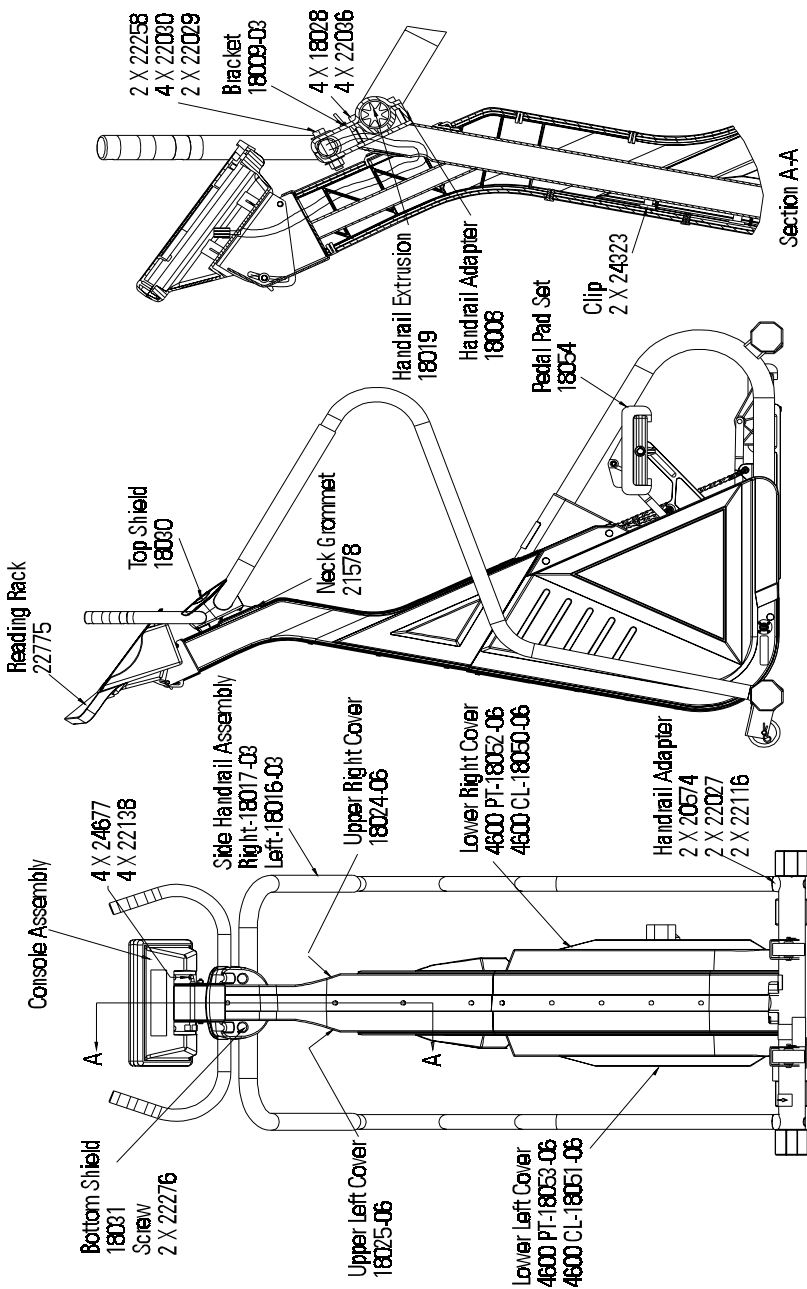
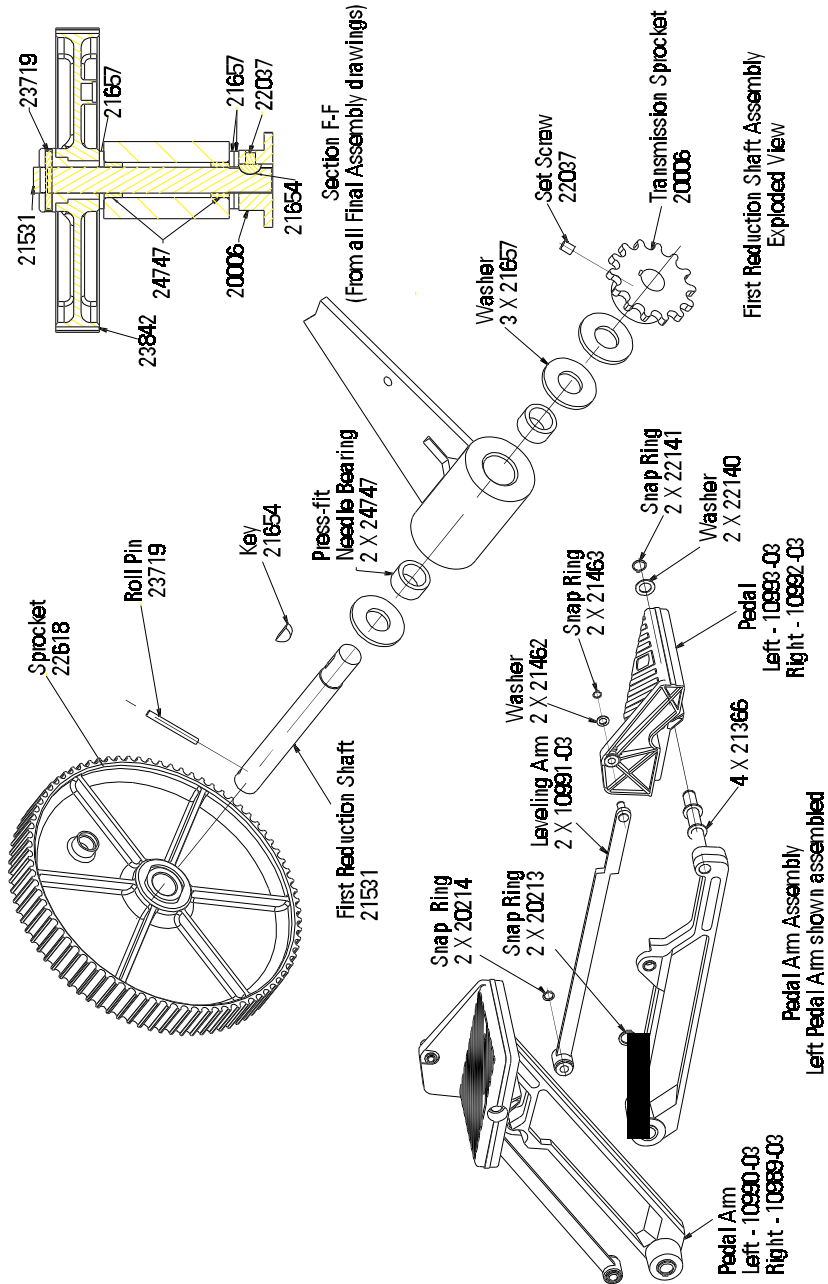


Figure 16: Covers - 4600 PT/CL



APPENDICES

Figure 17: Pedal Arm Assembly & First Reduction Shaft Assembly (4600/4400 PT/CL, 4200 PT)



APPENDICES

Figure 19: Final Assembly - Left, 4400/4200 PT

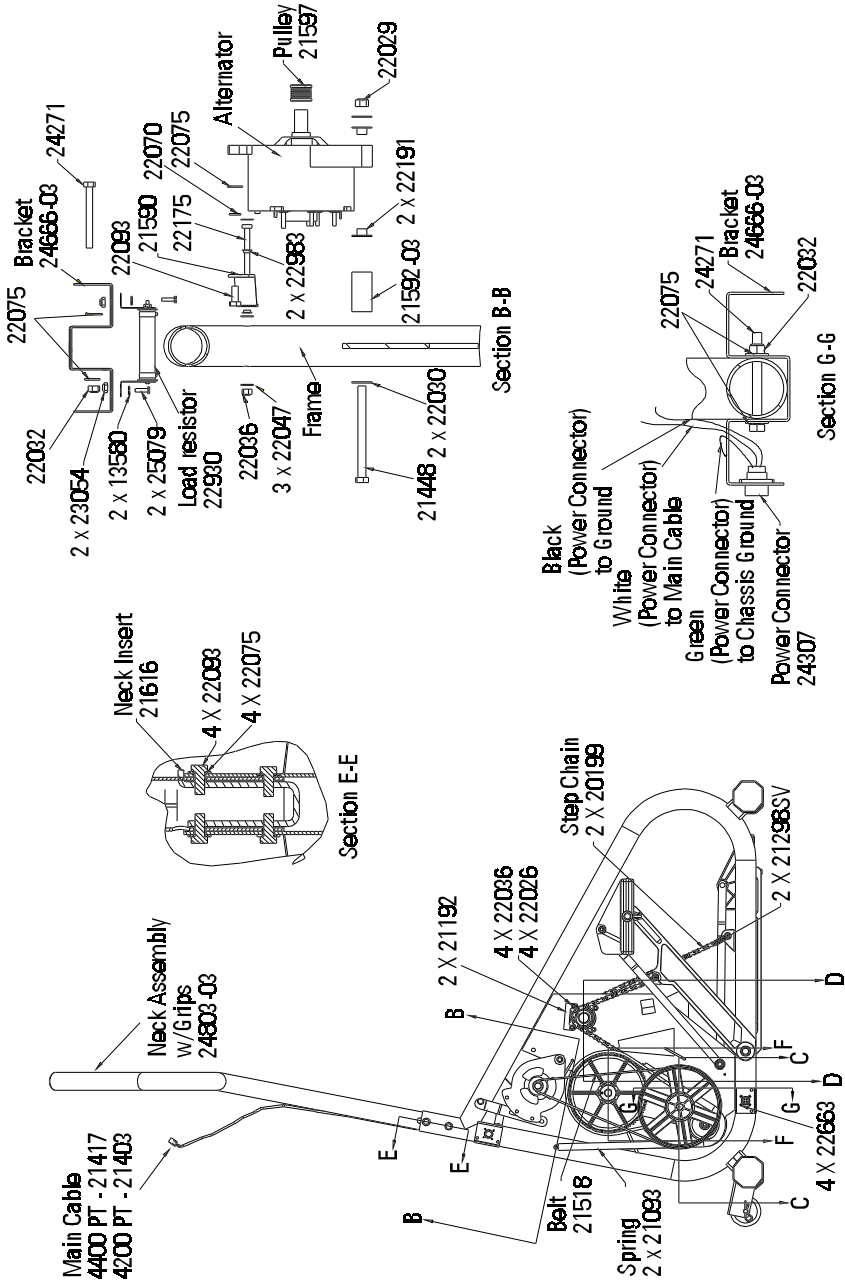


Figure 20: Final Assembly - Right, 4400/4200 PT

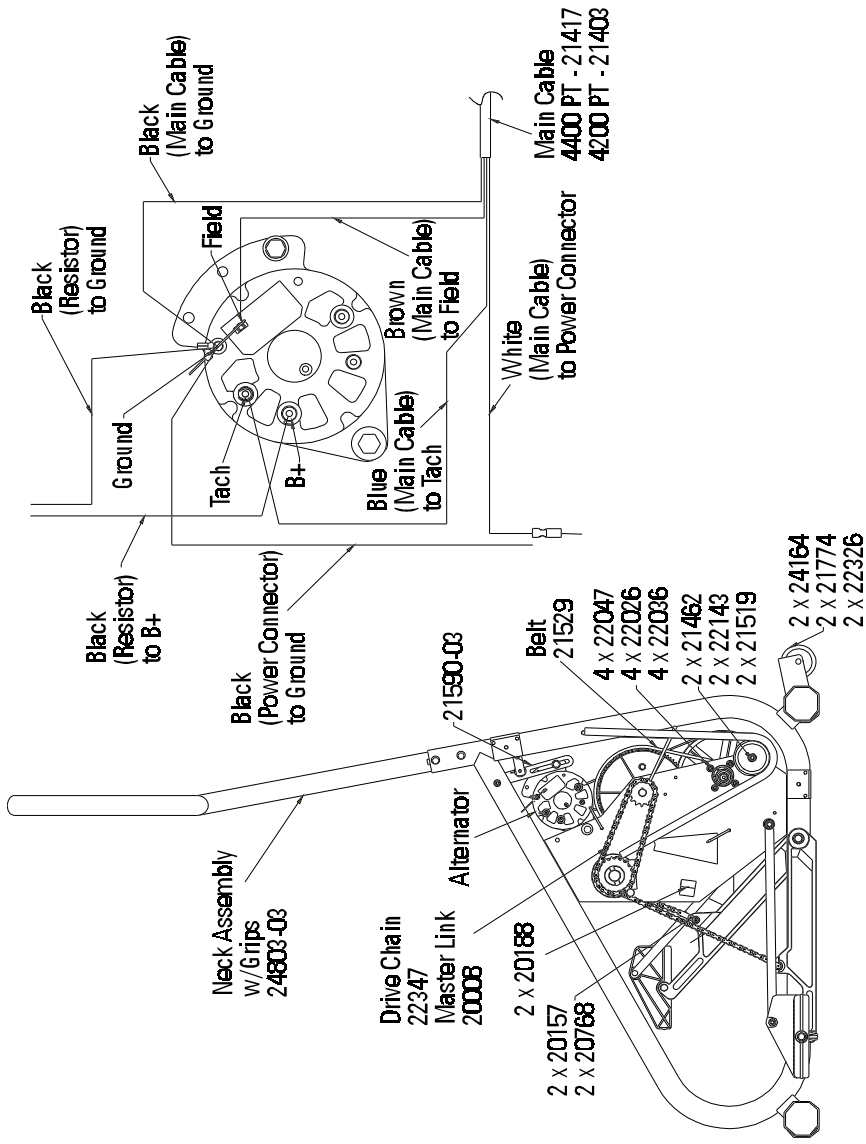
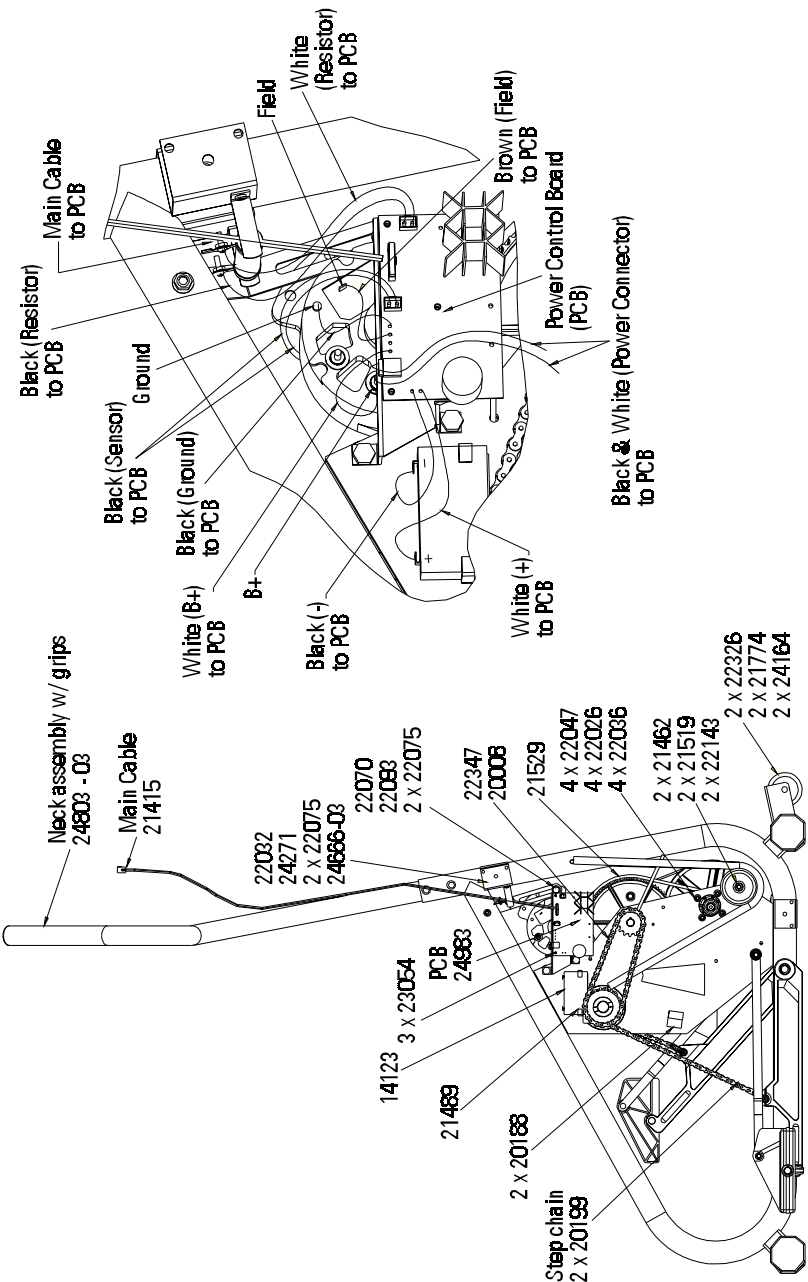


Figure 22: Final Assembly - Right, 4400 CL



APPENDICES

Figure 23: Covers - 4400 PT/CL, 4200 PT

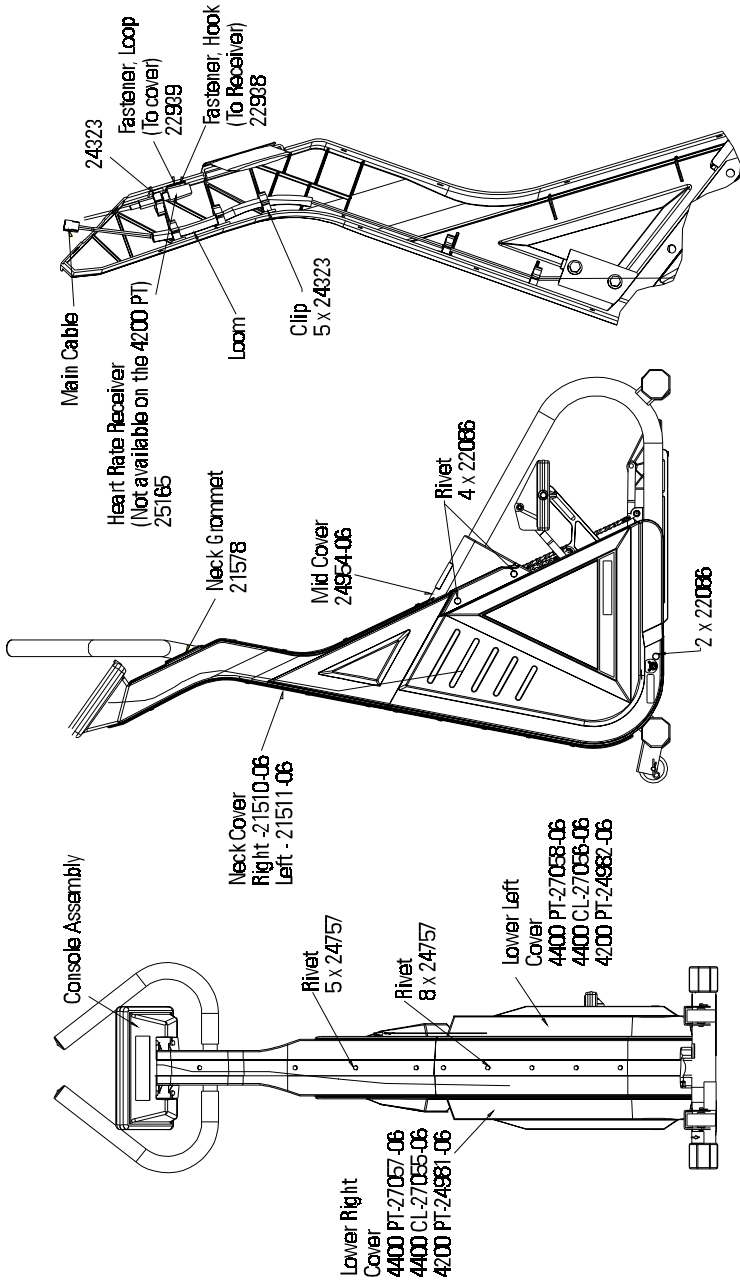
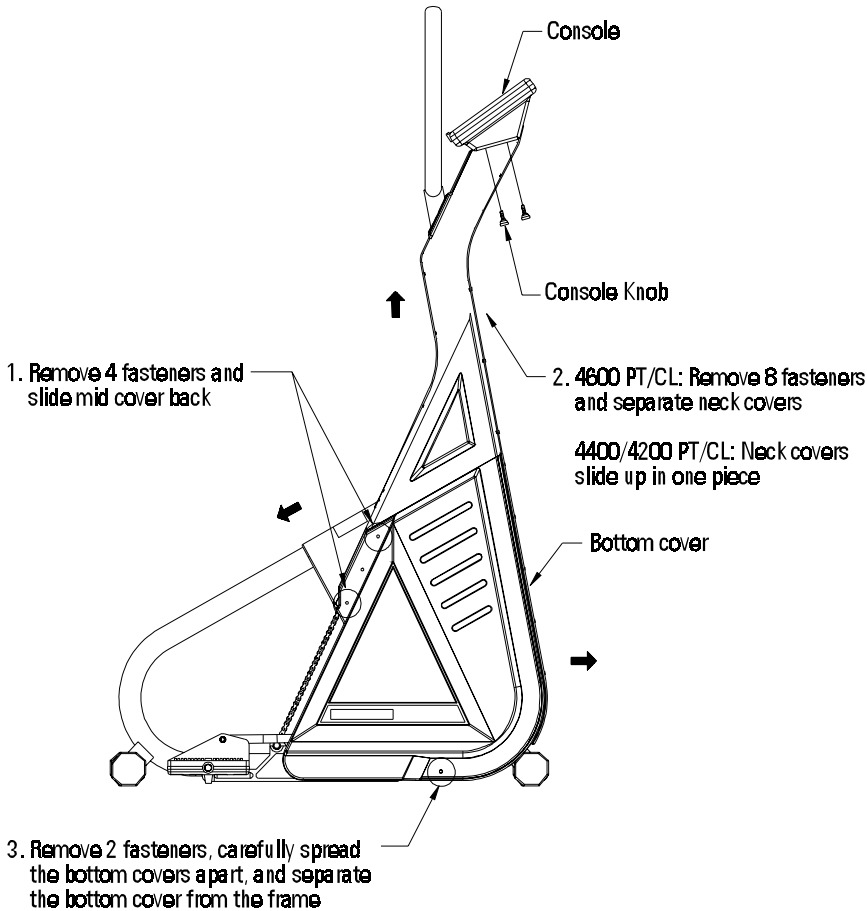


Figure 24: Cover Removal



APPENDICES

Figure 25: Cover fasteners

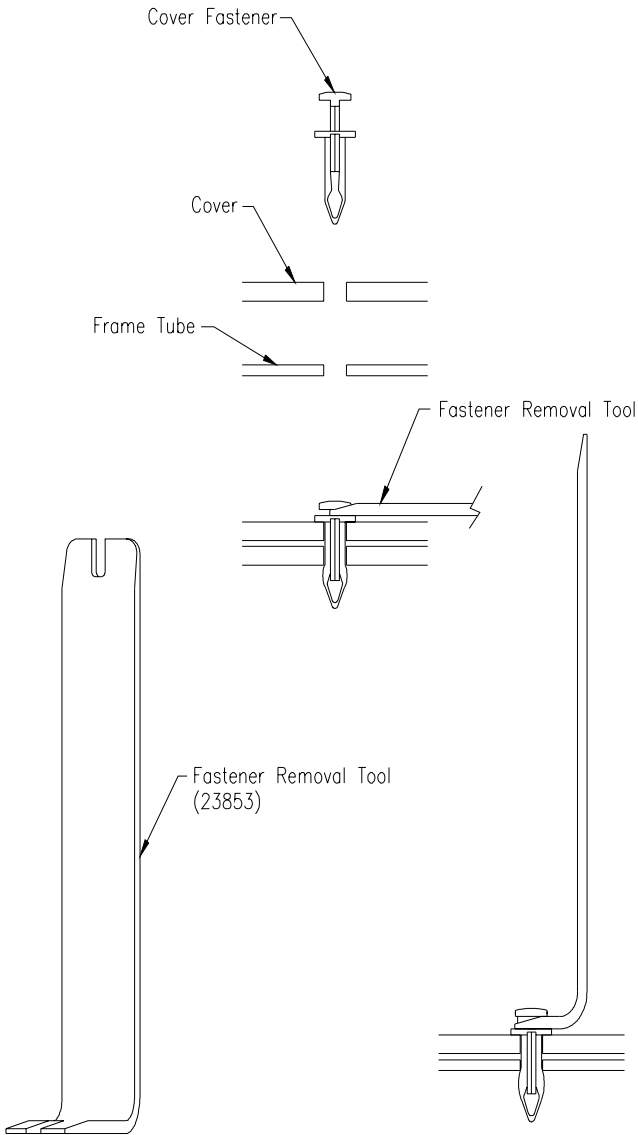
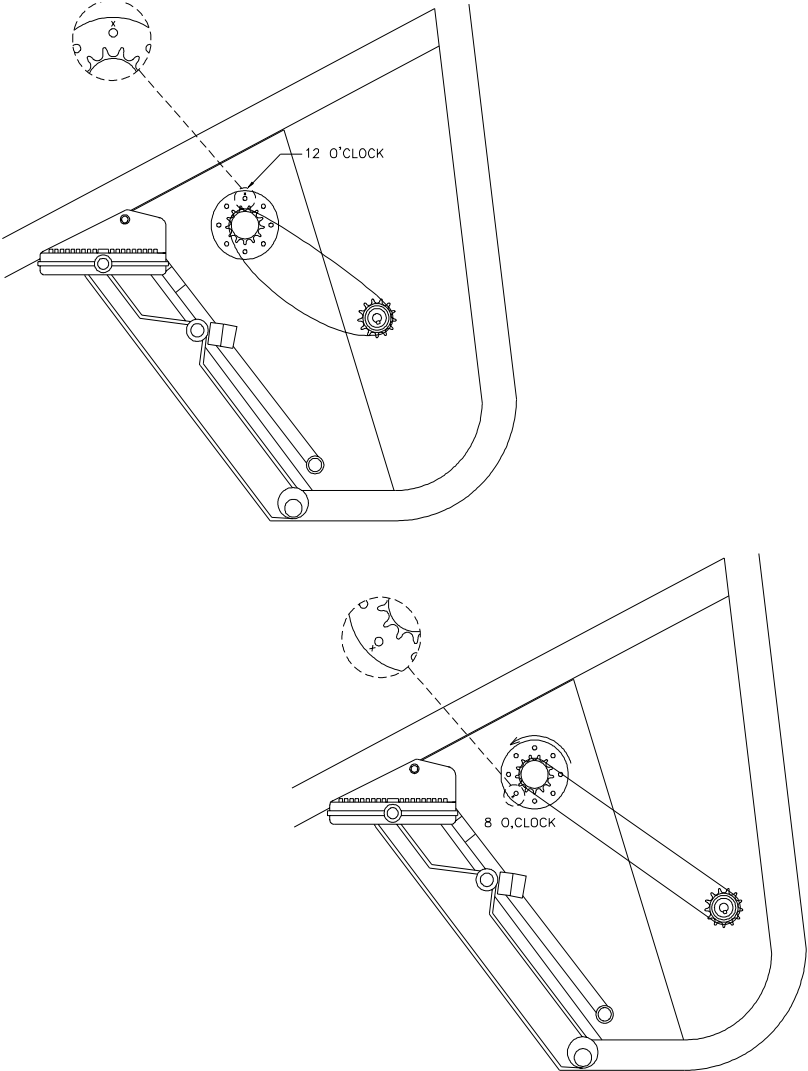


Figure 26: Drive Chain tensioning



APPENDICES

Figure 27: Belt Tension

