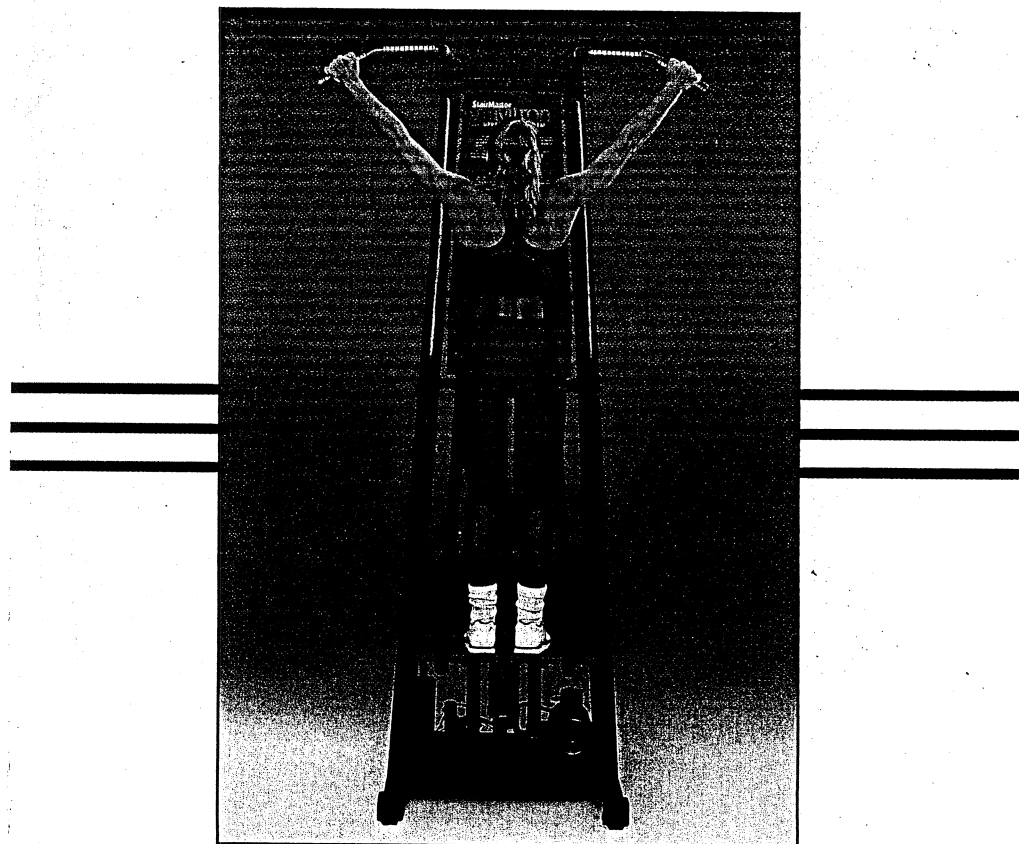


For Technical Call Center
REFERENCE ONLY!

StairMaster gravitron[®]

UPPER BODY SYSTEM



OWNER'S MANUAL

WARRANTY INFORMATION

This is to certify that the StairMaster® Gravitron® Upper Body System is warranted by StairMaster Exercise Systems to be free of all defects in materials and workmanship. This warranty does not apply to any defect caused by negligence, misuse, accident, alteration or improper maintenance. This warranty is non-transferable from the original owner.

If, within one year from date of purchase, the StairMaster Gravitron Upper Body System should prove defective, contact our Product Support Headquarters and report the defective part; be ready to tell us your date of purchase and the serial number. A purchase receipt or other proof of the date of the original purchase will be required before any warranty parts are sent. We will send you a replacement part and you will send us the defective part. Upon receipt of the defective part, we will inspect it and determine the cause of the defect. Shipping charges are paid by the customer after 45 days.

We neither assume nor authorize any representative or other person to assume for us any other warranties in connection with the sale 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.

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INTRODUCTION

The StairMaster Gravitrone Upper Body System is a highly effective tool for developing and strengthening upper body muscles. It is designed for use by individuals of practically all ages and fitness levels. Your purchase of this exercise system is a positive affirmation of your commitment to use the best available method to develop a high level of physical fitness. In order to attain the most from your StairMaster Gravitrone Upper Body System, read this manual thoroughly and adhere closely to the instructions.

WHAT IS IN THIS MANUAL?

Following the installation information and a brief explanation of how the Gravitrone Upper Body System works, this manual contains two major sections. The first section provides an explanation of how the machine should be used to achieve maximum results. The second section includes instructions and advice on how to properly maintain your machine. There is also a special "Appendix" section which offers additional information for the owner.

WHAT IS THE STAIRMASTER GRAVITRON UPPER BODY SYSTEM?

The StairMaster Gravitron Upper Body System is a machine designed for bar dip and pull-up exercises. It features a revolutionary platform step that provides lift assistance according to the exerciser's ability. The amount of lift assistance that is provided is based on the exerciser's body weight and the selected difficulty level.

Your StairMaster Gravitron Upper Body System provides effective pull-up and bar dip exercises to develop and strengthen upper body muscles. The muscles that will benefit from the regular use of this machine include:

- | | | |
|---------------------|--------------------|--------------------------------|
| • Biceps | • Grip and Forearm | • Rhomboideus Major |
| • Brachialis | • Latissimus Dorsi | • Rhomboideus Minor |
| • Brachioradialis | • Pectoralis Major | • Teres Major |
| • Deltoid Anterior | • Pectoralis Minor | • Teres Minor |
| • Deltoid Posterior | • Rectus Abdominis | • Trapezius I, II, III, and IV |
| • Erector Spinae | | • Triceps |

The StairMaster Gravitron Upper Body System is a natural extension of the extremely popular cardiovascular and lower body conditioning achieved with StairMaster stair climbing machines. Combine five minutes on the Gravitron Upper Body System with 15 minutes on a StairMaster 4000 PT exercise system or StairMaster Gauntlet exercise system and you have an efficient, complete upper body, lower body, and aerobic workout.

Table 1. StairMaster Gravitron Upper Body System Specifications

Physical:

Height	99 inches (252 cm)
Depth	45 inches (114 cm)
Width	48 inches (122 cm)
Weight	450 pounds (205 kg)

Power Module Characteristics:

Input Voltage	115 VAC
Input Power Consumption	402.5 watts
Output Voltage (with load)	115 VAC, 12 VDC, and 5 VDC

INSTALLATION

READ THESE INSTALLATION INSTRUCTIONS BEFORE MOVING THE MACHINE

The pull-up bars and dip bars may be disassembled by removing the retaining pin from each bar on the back of the Gravitron Upper Body System. We recommend that both the pull-up and dip bars be removed prior to moving. Reinstall the pull-up and dip bars appropriately after the move is complete. Following the above procedure will permit easier movement through hallways, doorways, etc, and will minimize potential damage to the area and any other equipment.

If necessary, you may remove the platform and tube assembly; take the rubber mat off the platform and remove the four 7/16" hex head bolts that are under the mat. Reinstall in reverse order when the machine is appropriately located. If you do not remove the platform tube assembly, secure the platform appropriately to the machine base to prevent unexpected movement that could cause injury to personnel while they are moving the machine.

The Gravitron Upper Body System requires at least two square feet of a 9'6" ceiling height for safe operation. Assure that this requirement has been considered before moving it to a new location. The machine weighs approximately 450 pounds and this is disproportionately centered toward the base. Be sure that adequate personnel are available before moving it, considering the machine's weight and center of gravity.



CAUTION

Do not connect the power cord to the power source until instructed to do so. Several installation steps are necessary before power can be applied safely.

HOW TO INSTALL THE STAIRMASTER GRAVITRON UPPER BODY SYSTEM

1. The Gravitron Upper Body System requires at least two square feet of a 9' 6" minimum ceiling height to protect the exerciser from bumping his or her head at the top of a pull-up lift. Be certain that this requirement has been met.
2. Locate the Gravitron Upper Body System at least one foot from both the rear and side walls to provide proper operating clearance.
3. Locate and remove the shipping strap that secures the platform to the Gravitron Upper Body System base.
4. Locate and remove the shipping strap that secures the power module to its mounting bracket, located at the left rear corner of the base.
5. Locate and remove the nylon tie that secures the console cable to the back tube. Remove the console. Remove the zip-lock bag from the console, and mount the console back onto the backboard. Attach the cable to the connector on the back of the console. Align the notch of the cable connector with the key in the console connector, press in, and tighten the lock ring finger-tight.
6. Tighten the knobs on the back of the console securely.

7. Observe the LEVEL decal on the rear of the machine and level according to instructions. After leveling, be sure the machine sits squarely and securely on the floor.
8. Locate and remove the nylon tie that fastens the yellow power cord to the power module. Fully uncoil the power cord and route it out the back of the machine. Be careful to place the cord where it will not be pinched or cut by moving parts.
9. Inspect the four connections on the bottom of the power module. Be sure each cord is connected according to the decal instructions that are mounted on the power module.
10. Connect the power module to the 120 VAC outlet. Customers with wall outlet voltage greater than 120 VAC should contact StairMaster Exercise Systems to obtain an appropriate transformer.
11. Locate the GFI protector* on the yellow power cord and press the button marked RESET. The LED on the power module should illuminate to indicate that power is applied to the machine. If the LED on the power module is not illuminated, press the red reset button on the top of the power module and release it. If it still does not light, consult the Troubleshooting Tips on pages 38 to 44.
12. Observe that the console's bar graph (located at the left in the LEVEL/PACE section of the console) shows a lighted bar, moving up and down. This is the Attract Mode.
13. The Gravitron Upper Body System is now ready for operational testing prior to use.

* The GFI protector on the power cord provides Ground Fault Interruption of the AC input power if electrical current flows through earth ground. This is considered the best method of minimizing electrical shock hazards, especially where moisture is present.

OPERATIONAL TESTS

Perform the Display Test, the Leak Test, the Safety Valve Test, and the Functional Test before anyone attempts to use the StairMaster Gravitron Upper Body System. Then perform all four tests periodically to insure safe and proper operation.

DISPLAY TEST

1. Verify that the console is in the Attract Mode, characterized by a rising and falling bar on the bar graph in the LEVEL/PACE section.
2. Press 015 and ENT (Enter). (Do not press the ON/OFF switch.)
3. Check to see that all numeric displays show 8, that all 40 bar graph segments are illuminated, and that the decimal point is lit in the MINUTES window.
4. Press the red ON/OFF switch to end the test.

LEAK TEST



WARNING

Stand beside the machine and assure that there will be no obstruction to the platform's movement during all the steps of this test.

1. Verify that the console is in the Attract Mode (rising and falling bar on the bar graph).

2. Press 2020 and ENT on the keypad. A 3-digit number in the WORK-OUT WEIGHT window indicates the pressure in the system. This is a computer-generated number that is proportional to the air pressure. It should read between 000 and 003; if not, you need to adjust the gain on the power module (see page 34).
3. Press ENT. The compressor should run while the value in the window increases gradually. The platform should rise after a few seconds.
4. Allow the pressure to increase until the display shows approximately 100. At that time, press ENT to turn off the compressor.
5. Observe the display for three minutes. If the indicated pressure drops less than 10%, the Leak Test indicates a satisfactory condition. However, if the pressure drops 10% or more in three minutes, this indicates that there is a leak in the system; complete steps 6 through 8 and then consult the Troubleshooting Tips on pages 38 to 44 to identify and repair the leak.
6. Check to be sure that there is nothing between the platform and the floor.
7. Press CLR (Clear). The solenoid valve should open and allow the system to depressurize. The platform will fall gradually to the bottom as the pressure decreases. Support the platform as it falls to prevent it from coming down too hard.
8. When the platform rests at the bottom and the indicated pressure has stopped decreasing, press the red ON/OFF switch to complete the test.

SAFETY VALVE TEST



WARNING

For safety reasons, conduct the Safety Valve Test frequently to insure that the safety valve protects the exercisers from injury when dismounting.

The safety valve prevents the lift platform from rising too rapidly if a person should inadvertently step off the machine without first pressing the ON/OFF switch.

1. Verify that the Gravitron Upper Body System is in the Attract Mode (rising and falling bar on the bar graph).
2. Step onto the platform.
3. Press the red ON/OFF switch.
4. Enter your accurate body weight and press ENT.
5. Press 8 and ENT to select workout level 8. The compressor will start to run and pressurize the system. The bar in the bargraph will move down from the top toward the "8" level.
6. After the compressor stops and the bar rests at the 8 level, step off the platform. (If you slowly slide your foot off the platform, the platform will rapidly rise to the top of its travel. This will not test the safety valve.)



WARNING

Stand clear so that the platform will not strike you as it rises.

7. Watch the platform as it rises. If the safety valve operates properly, the platform should stop rising after moving no more than 12 inches. If the platform rises more than 12 inches, the safety valve must be adjusted or replaced; refer to the procedures below for adjusting the safety valve or the replacement instructions on page 51.
8. Press the red ON/OFF switch and allow the pressure to bleed down. The machine will return to its Attract Mode.

FUNCTIONAL TEST

1. Follow the instructions on the backboard decal and program the Gravitron Upper Body System appropriately for a workout.
2. Check that all displays are operating normally (see page 13 for a description of displays).
3. Assure that the lift platform mechanism is operating smoothly. If the lift mechanism exhibits any abnormalities (squeaks, etc.), consult the Troubleshooting Tips starting on page 38.

SAFETY VALVE ADJUSTMENT

The safety valve is an adjustable excess flow valve designed to prevent the uncontrolled flow of air. The flow rate through the valve can be changed externally by turning the adjusting screw. As you are standing on the platform facing the Gravitron Upper Body System, the safety valve is the second component from the right on the accumulator tank.

When performing the safety valve test, if the platform rises less than 12 inches, the adjustable screw should be turned counterclockwise. If the platform rises more than 12 inches, turn the adjustable screw clockwise. The number of turns will depend on the amount of adjustment needed. If the platform rises all the way to the top, you will need to turn the adjustable screw clockwise four turns. If the platform rises 8 inches, you will need to turn the adjustable screw counterclockwise one turn.

GUIDELINES FOR SAFE OPERATION

Your StairMaster Gravitron Upper Body System is a carefully engineered tool that will provide a physical workout program tailored to you or your customer's particular requirements. We hope that you will use it wisely and obtain all of the benefits it can offer you.

To maximize the results you can achieve and minimize the possibility of injury, always adhere closely to the following guidelines. If you compromise any of these guidelines, you compromise the effectiveness of the exercise experience, expose yourself (and possibly others) to injury, and reduce the longevity of your StairMaster Gravitron Upper Body System.

Suggestion: These guidelines are directed to you, as the owner of the machine. You should insist on instructing all users so that they will follow the same guidelines.

1. Obtain a complete physical examination from your medical doctor and enlist the physician's aid in developing an exercise program suitable for your current health status.
2. Keep your hands and feet away from all moving parts. Of course, you must stand on the platform (which moves) to exercise.
3. Never attempt any adjustments or repairs while an exercise program is in progress.
4. If the machine has damaged parts or fails to operate properly, do not attempt to use it until all faults have been corrected.
5. Never attempt to operate the StairMaster Gravitron Upper Body System without having the power applied or if the computer does not appear to be operating properly.
6. When using the StairMaster Upper Body system for the first time, exercise at the lower difficulty levels until you feel comfortable and capable of higher levels.

7. Maximum speed is limited by the safety valve; the recommended speed is shown on the bar graph. Your actual speed and the duration of your exercise should always be subject to how you feel. Apparent heart rate or any other external influence should never override your judgment when exercising.
8. Overweight people using the machine for the first time should proceed cautiously. Even though an overweight individual may not have a history of a serious physical problem, the individual may perceive the exercise to be far less intense than it really is, resulting in over-exertion.
9. Always be certain that no person is near the moving platform while you exercise. Warn anyone away if they should come near.
10. Do not allow small children to play unattended near the StairMaster Gravitron Upper Body System. Serious injury could result from an infant's or a small child's fascination with the moving components.
11. Although the equipment manufactured by StairMaster Exercise Systems has been thoroughly inspected prior to shipment, proper installation and regular maintenance are required for safety. Maintenance is the sole responsibility of the owner.
12. StairMaster Exercise Systems does not recommend user servicing of the electronic components. They have been designed to be free of adjustments and do not require any maintenance. Opening the console or power module will void the warranty.

HOW TO EXERCISE ON THE STAIRMASTER GRAVITRON UPPER BODY SYSTEM



WARNING

It at any time during your workout you feel pain or feel faint or are short of breath, STOP exercising immediately.

Do not turn off the machine during the workout cycle unless the platform is in the down position.

THE WORKOUT CYCLE

A normal workout cycle includes nine sequential parts:

1. User steps on platform.
2. User presses red power switch to turn on the machine.
3. User enters weight on keypad.
4. User enters selected difficulty level on keypad.
5. Compressor builds up pressure to match weight and difficulty level entries.
6. Compressor stops and workout period begins.
7. Workout period continues until user presses red power switch to turn off the power.
8. Pressure is relieved.
9. Workout complete; user steps off platform.

THE CONSOLE

The status of the machine is shown on the display console, located directly in front of the user during the workout. At the left is a difficulty level indicator marked LEVEL/PACE. Across the top are direct digital readouts for REPS, Time, and Workout Weight. At the right is the large red power on/off switch and a keypad with keys for the digits, 0 through 9, and an ENT (Enter) key and a CLR (Clear) key.

After power is connected to the machine and before a workout period begins, the bar graph in the LEVEL/PACE section displays a lighted bar that moves up and down constantly. After the red power switch is pressed to start the workout cycle, a vertical bar fills the indicator window. When the weight and difficulty level have been entered, the compressor runs and the bar graph monitors the buildup of system pressure, moving down until it reaches the selected difficulty level. As soon as the pressure is correct, the compressor turns off and the lighted bar moves up and down to provide a workout pace display.

During the workout period, each time the user lifts his/her body, the platform raises. This causes the system pressure to decrease. The electronic system senses the pressure decrease and count this as one repetition (REP). An electronic counter displays how many REPS have been counted during a workout cycle.

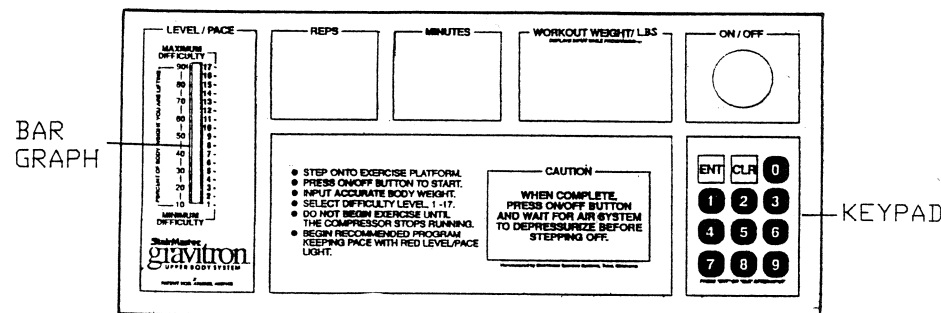


Figure 1: The Console

The Minutes window displays elapsed time in minutes and tenths of minutes. It starts when the workout cycle begins and continues to count time until the red power switch is pressed again to end the cycle. If the elapsed time exceeds 9.9 minutes, the window will display the time in minutes (two digits without a decimal point, such as 10, 11, 12, etc.). The maximum capacity of the timer is 99 minutes.

During input, the Workout Weight window displays the keyboard entry of the user's weight and selected difficulty level, so the user can verify the inputs and change if necessary. Then, during the rest of the workout cycle, the Workout Weight window displays the amount of body weight the user must lift. This is the weight that he/she entered minus the lift pressure provided by the Gravitron Upper Body System. For example, if the user enters 180 pounds as his/her body weight and then enters a Difficulty Level of 5, the machine will lift 70% (126 pounds) of body weight and the user will lift only 30% (54 pounds). For this example, during the workout cycle the window will display 054.

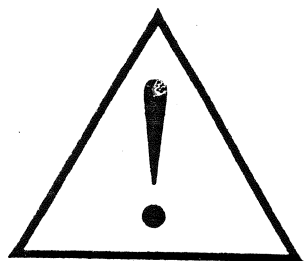


Figure 2: International Warning Symbol

The above universal WARNING decal is mounted on the safety bar above the rear of the platform. It should warn all persons in the vicinity of the platform that it is dangerous for them to stand close to the safety bar because it will move up and down with the platform during an exercise cycle and could seriously injure anyone if it should strike them. Before starting your exercise, look to the rear and ensure that no person, especially a child, is close to the platform and safety bar.

BASIC CONDITIONING WORKOUT PROGRAM



WARNING

Consult physician before beginning any exercise program. Stop exercise immediately if you feel faint, experience pain or have difficulty breathing.

1. Warm-up (by stretching or doing light calisthenics) for at least five minutes prior to exercising on the StairMaster Gravitron Upper Body System.
2. Step onto the platform. Stand erect.
3. Press the large red ON/OFF switch at the right side of the console.
4. Enter your accurate weight (in pounds or, if you have a Metric Console, in kilograms) on the key pad and press the ENT key after you have verified that the numbers that are displayed in the WORKOUT WEIGHT window are correct. Entry errors may be erased simply by pressing the CLR key.
5. See the bar graph display on the console for the percent of your body weight you will lift for each of the 17 difficulty levels. Enter the difficulty level at which you choose to exercise (1 for easiest to 17 for most difficult) and press ENT.
6. The compressor will run to build up the proper pressure for your weight and exercise difficulty level. Wait until the compressor stops running and the pace light in the LEVEL/PACE window moves up and down to suggest a pace. If you attempt to do a dip or pull-up while the air compressor is running, the compressor will stop and the system will depressurize.

7. Begin your basic exercise routine. Start with your hands on the dip bars that are at chest level and proceed through the following steps:
- Push your body upward until your arms are straight. Then lower your body until your elbows form right angles. Keep your body straight during the movement. Follow the pace light. This full cycle (REP) should take about 3 seconds. Then repeat nine more times for a total of ten REPS.
 - Reach up and grasp the center portion of each pull-up bar at the top of the Gravitron Upper Body System (if necessary, you may step up on the step pad in front of the platform so that you can reach the pull-up bar). Pull your body up until your chin is higher than your hands; then lower your body until your arms are extended. Follow the pace light. This full cycle (REP) should take about 3 seconds. Repeat nine more times for a total of ten REPS.
 - Reach down and grasp the dip bars again. Repeat step *a* above for ten more repetitions.
 - Reach up and grasp the wide grips on the pull-up bars at the top (palms forward). Repeat step *b* above for ten more REPS, using the wider separation between your hands.
 - Reach down and grasp the dip bars again. Repeat step *a* above for ten more repetitions.
 - Reach up and grasp the parallel grips on the pull-up bars at the top (palms facing in toward each other). Repeat step *b* above for ten more REPS, using the narrow separation between your hands.
 - If you cannot perform ten REPS in any one or more steps during the above routine, refer to page 19 for instructions on how to change difficulty levels during a workout.
 - Increase the difficulty level as conditioning permits.



WARNING

Do not dismount from the Gravitron Upper Body System Yet.

8. This completes a basic workout program. If you kept pace with the moving bar at the left side of the console and minimized your rest periods between sets, your total elapsed time should be about five minutes and the window that shows REPS should read 60. The timer will continue to run until you press the ON/OFF switch to indicate the end of the workout.
9. When you have completed your workout, press the red ON/OFF switch to indicate that you are through. Then wait until the pressure in the machine has been relieved before you step off the platform.



WARNING

If you should inadvertently step off the platform while pressure is still present, the platform will rise abruptly.

WORKOUT PROGRAM FOR BUILDING STRENGTH

When you exercise faithfully on the StairMaster Gravitron Upper Body System, you will build strength in the muscles in your upper body. Then you will find that you can accomplish the basic exercise routine using a higher difficulty level.

RECOMMENDED PROGRAMS

If you wish to pursue a program for the purpose of developing muscular fitness, adhere to the following recommendations:

1. Use the basic exercise routine for your program.
2. Select the maximum difficulty level that allows 6 REPS per set before muscle failure occurs (momentary inability to perform additional REPS).
3. Exercise to failure. Do as many REPS per set as possible. Rest for one minute between sets. The entire program may require more than five minutes, even if you maintain the suggested pace of one REP every three seconds.
4. Increase the difficulty level when you can consistently do 12 REPS per set.

The basic and strength-building programs, outlined below, are suggested routines. Many variations are possible. For example, you may wish to vary the number of REPS for bar dips or the three variations of pull-ups; you are allowed freedom in planning your workout program.

		<u>SUGGESTED SEQUENCE</u>	
		REPS	
SET	EXERCISE	BASIC	BUILD
#1	Bar Dip	10	6-12
#2	Military Pull-up	10	6-12
#3	Bar Dip	10	6-12
#4	Wide Grip Pull-up	10	6-12
#5	Bar Dip	10	6-12
#6	Parallel Bar Pull-up	10	6-12
Total		60	36-72

OTHER WORKOUT PROGRAMS; PYRAMIDING

Some users may prefer to pyramid their workout by starting at one difficulty level and systematically changing to different difficulty levels during the workout.

Use the following steps to pyramid your workout:

1. When a difficulty level change is desired during the workout, allow the platform to bottom. Then press CLEAR on the keypad. The WORKOUT WEIGHT window will flash zeros.
2. Enter the new difficulty level and press ENTER.
3. The air compressor will activate if you select a level less than the previous level, or air will be expelled if you select a level greater than the previous level.
4. When the workout weight appears in the WORKOUT WEIGHT window and the pace light begins moving, you may proceed with your workout.

HOW THE STAIRMASTER GRAVITRON UPPER BODY SYSTEM WORKS

The StairMaster Gravitron Upper Body System includes three dependent systems; mechanical, pneumatic, and electrical. To understand operation of the machine, you need to understand each of the systems and how they interact.

1. **Mechanical System.** The mechanical system is made up of the frame and lift components. The lift uses a series of rotating members to produce vertical motion of the platform while maintaining the platform's parallel orientation with the floor. It is built as dual parallelograms that pivot together to accomplish this motion. The more subtle aspect of the lift is its relationship to the pressurized cylinder that provides vertical lift pressure to aid the exerciser by supporting part of his/her weight.
2. **Pneumatic System.** The pneumatic system includes an air compressor with its attached air filter, a check valve, an accumulator tank, a safety valve, a pressure transducer, a solenoid valve with its attached air filter, an air cylinder, connecting hoses, and an air pressure gauge.

The air compressor builds up pressure for the system at the start of a workout. The check valve prevents air from leaking back through the compressor valves.

The accumulator is a storage tank that tunes the pneumatic system to the mechanical system. Its volume is precisely calculated so that the decrease in pressure as the system volume increases (when the cylinder extends) offsets the change in leverage exerted on the lift.

The safety valve limits the rate of air flow between the accumulator tank and the cylinder. If the user exceeds the rate indicated by the pace light, the system will not provide the expected lift. If the user fails to depressurize the system before he or she steps off the platform, the safety valve limits the sudden rise of the platform to no more than 12 inches.

The pressure transducer creates an electrical signal that is proportional to system pressure and provides this signal to the electrical system. The pressure decreases each time the user raises the platform and increases as the platform goes down again. The console electronics sense each decrease in pressure and count this as a REP.

At the end of a workout, the operator presses the ON/OFF switch to depressurize the system. This actuates the solenoid valve to relieve the pressure in the accumulator. It has a pickup tube that reaches the bottom of the accumulator, and this aids in blowing out any moisture or debris that may have entered the accumulator. After the pressure has been relieved, the solenoid valve will close securely so that pressure can be built again to provide the correct lifting assist when the next exercise cycle begins.

The air cylinder provides the physical pressure on the lift mechanism. When the platform is down, the air cylinder is also down and the total volume of the pneumatic system is the volume of the accumulator plus the attaching hose. When the platform rises, the cylinder extends and this increases the volume of the pneumatic system by the volume of the cylinder, so the pressure decreases. The mechanical placement of the cylinder with respect to the lift mechanism provides a leverage change that offsets the change in pressure in the pneumatic system, and the upward force against the platform remains constant throughout its range of travel.

Starting February 9, 1990, an analog pressure gauge has been added to the pneumatic system. It is located between the accumulator tank and the check valve that blocks air from bleeding back through the compressor. The gauge reads the system pressure directly in pounds per square inch (psi). A pressure gauge can be ordered from the Service Department and added easily to earlier machines. Since the pressure gauge and the transducer are both subjected to the same system pressure at all times, the pneumatic system is much easier to troubleshoot. See information on Troubleshooting starting on page 38.

3. **Electrical System.** The electrical system includes the power module, the console, the pressure transducer (shared by the pneumatic system), the solenoid (shared by the pneumatic system), and cables that interconnect the components.

The power module converts the incoming AC power to DC outputs that are required to operate the electronics in the console. It also includes an amplifier and filter to increase the range of signals from the transducer (pressure measurements) into a range that can drive the console circuits. Two switches in the power module turn 115 VAC power on and off for the compressor and the solenoid valve. The connectors for cables to the transducer, console, compressor, and solenoid valve are all identified by markings on the power module case.

The AC input power cord includes a GFI (Ground Fault Indicator). This is an integral part of the power cord. Its purpose is to disconnect the input AC power whenever a ground current in excess of six milliamperes exists in the electrical equipment. There is a reset switch on the GFI that can be pressed to restore power after an interruption. This is the most reliable method known to minimize electrical shock hazards, especially where moisture is present.

The pressure transducer operates on a precise 5-volt DC from the power module and furnishes an output signal proportional to air pressure in the system. The signal is amplified in the power module and furnished to the computer in the console so that the computer can keep track of the system's pneumatic pressure.

At the end of a workout, the user presses the red ON/OFF switch. The solenoid valve is actuated to relieve the pressure in the accumulator tank and the system. The solenoid valve must then close securely to permit a pressure buildup when the next cycle of operation begins.

The console contains the computer and the operator interfaces. The computer controls the overall flow of the workout. Its operating sequence starts when you press the red ON/OFF switch. You enter your weight and the desired difficulty level, 1 to 17. Then the computer verifies that the solenoid valve is closed before it turns on the air compressor. The computer monitors the pressure build-up and displays the result in the LEVEL/PACE window at the left side of the

console. When the transducer indicates that the system pressure has built up to the amount that matches the weight and difficulty level that you have entered, the computer turns off the compressor and starts to count and indicate the number of REPS and the elapsed time. Then when you press the red ON/OFF switch again at the end of your workout, the computer actuates the solenoid to relieve the system pressure. It then returns the machine to the Attract mode, with the lighted level bar moving up and down through the LEVEL/PACE window at the left on the console.

MINIMUM DIFFICULTY LEVEL

There are two effects of workout weight that require the computer to restrict access to the lower difficulty levels. One is the maximum amount of assist available from the air pressure system, and the other is how the computer compensates for mechanical friction within the lift mechanism.

MAXIMUM ASSIST

The maximum upward force that the Gravitron Upper Body System can produce is 220 pounds. This means that, for difficulty level 1, the maximum body weight is 243 pounds because any greater body weight would require more than 220 pounds of lift for level 1. If the user's weight is more than 243 pounds, the computer adjusts the selected difficulty level to the lowest possible level when the users requests a lower level.

Figure 1 is a chart that shows the minimum difficulty levels that can be used for weights greater than 243 pounds. It shows, for example, that if a user's weight is between 275 pounds and 293 pounds, difficulty level 4 is the minimum level that can be selected. If this user requested level 2, the computer would automatically change the request to 4.

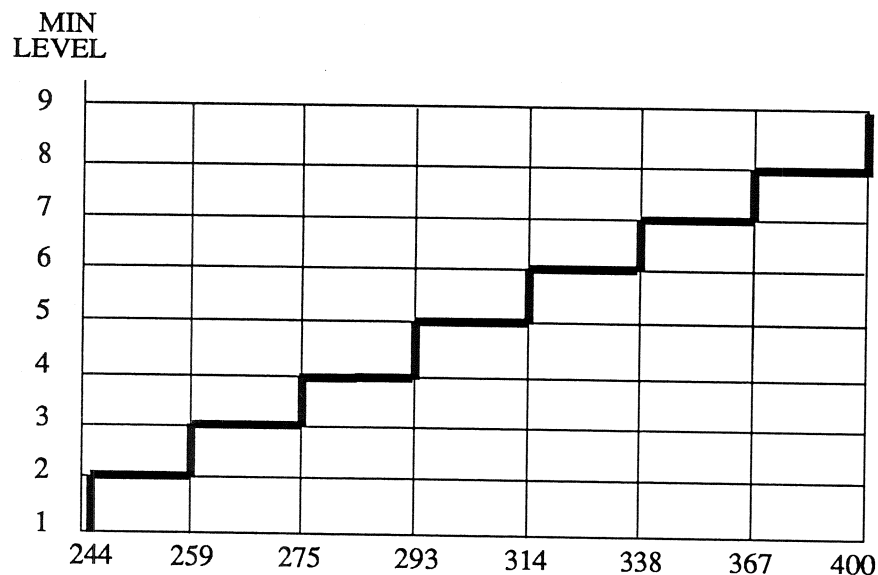
MINIMUM WORKOUT WEIGHT

The workout weight is the number of pounds that you will lift during the exercise. It is a percentage of your total weight, selected as a difficulty level (1 for 10% to 17 for 90%) times your actual weight that you entered on the keypad. The workout weight is the number that appears in the console window during an exercise.

The minimum workout weight is 20 pounds. This limit is imposed because the computer cannot accurately predict the effects of mechanical friction within the lift mechanism.

Figure 3. Minimum Difficulty Level vs Body Weight

(The chart in Figure 3 could be extended to the 999 pound limit available from the console keypad.)



MAINTENANCE

HELPFUL HINTS

If you keep your StairMaster Gravitron Upper Body System serviced and in good condition, it will operate more efficiently and last longer. We recommend that you use the following service guidelines.

LUBRICATION

The StairMaster Gravitron Upper Body System is designed to be free of periodic lubrication requirements. Each of the joints between moving parts includes a permanently lubricated bushing. Keep the bushings clean and free from accumulation of dust and dirt, and they should function as intended indefinitely.

If a squeak should develop in the lift mechanism, you should check the bushings to determine whether they have retained the permanently lubricated condition. Heat a suspected bushing with a match or similar heat source; bubbles of oil should appear on the surface of the bushing. If necessary, you can wipe a small amount of light mineral oil on the bushing surface to restore its condition.

CLEANING AND INSPECTING

1. DO NOT USE GLASS CLEANERS OR ANY OTHER HOUSEHOLD CLEANER ON THE CONSOLE. Use only a water-dampened cloth when you clean the electronic parts.
2. Clean the exterior of your machine daily using any common household cleaner such as *Fantastic*, *409*, etc.

3. Thoroughly clean the entire machine at least once a week.
4. All of the connection points between moving parts include bushings with permanent lubrication. If any joints tend to stiffen, this is probably caused by an accumulation of dust and dirt. See the information in Parts Replacement for disassembly instructions. Use a degreaser to clean the affected parts before reassembly. Read the instructions on the degreaser container before using; some degreasers are harsh and can damage painted surfaces.
5. If cleaning the bushings does not relieve the stiffness, see further suggestions under Lubrication on page 25.

TROUBLESHOOTING

AIR PRESSURE GAUGE

All Gravitron Upper Body Systems manufactured since February 9, 1990, have had an air pressure gauge installed. The pressure gauge is located between the accumulator tank and the check valve; therefore the gauge reads the pressure in the system. This gauge is to be used primarily as a tool to ensure that the system is providing the correct lift for the assist level selected (see page 34). It also can be used to troubleshoot problems that may develop. If your machine does not have an air pressure gauge, it can easily be added; contact StairMaster Exercise Systems for details.

Before using the air pressure gauge for any procedure, always verify that it reads zero when the system is depressurized. If it does not read zero, use the mechanical adjustment to correct the pointer position. Whenever you start the compressor during any test that you perform, you must be aware that the platform will rise if you are not standing on the the platform.

1. Use 2020 ENTER to engage the machine. Press ENTER again to turn on the compressor. Allow the machine to run for approximately 10 seconds and press ENTER again to stop the compressor. When the machine shuts off, if the Workout Weight window reads zero but the air pressure gauge shows there is pressure in the tank, the problem is **electrical**, not pneumatic. Press CLEAR to relieve the pressure. Check the list of troubleshooting tips, starting on page 38, to find a suggestion that matches your problem.
2. Again, use 2020 ENTER - ENTER to engage the machine. If the compressor runs but the pressure gauge continues to read zero, then probably either the compressor or the check valve is bad. This problem is **pneumatic**. Press ENTER again to stop the compressor.
3. If the problem is pneumatic, use the Operational Tests included in the Installation instructions, starting on page 6, to determine that your System is operating as it should.

4. You can also use the data in Tables 2 and 3 to aid in checking for the proper pressure build-up in the pneumatic system; if necessary, use the gain adjustment procedures (page 34) to correct any differences that you may find.

- a. In Table 2, the first column lists all of the possible numbers from 0 through 255 that can be displayed on the console WORKOUT WEIGHT window after you have used the 2020 ENTER ENTER procedure. The second column lists the air pressure in psi (rounded to the nearest whole number) that will be shown on the pressure gauge when the first column corresponding number is displayed on the console. The reason for having two different numbers is that the pressure signal from the transducer is amplified in the power module and then digitized in an analog-to-digital converter to identify the pressure. The range of the digitizer is from 0 through 255. The pressure would have a corresponding range of 0 to 150 psi, although a pop valve in the system prevents a buildup to more than 120 psi so the entire range is not used. When the system pressure is at its maximum value, 120 psi - displayed as 204 units - the Gravitron Upper Body System provides its maximum lift of 220 pounds.
- b. For further evaluation, Table 3, the Gravitron Air Pressure Chart, lists the air pressure in psi that should be generated in the system during a normal workout. To use Table 3, find the body weight (pounds) in the left column that you have entered on the console, and follow the horizontal line to the column that lists the difficulty level you have also entered. After the compressor has completed the pressure build-up, the correct pressure in psi is listed at this location in the table. (Do not use the number in the WORKOUT WEIGHT window, since it shows the weight that the user will lift rather than a number you can interpret as psi.)

NOTE: The pressure will vary during the workout (i.e., when the platform rises, pressure will drop). Use Table 3 only with the platform resting on the bottom.

Table 2. Gravitron Display/Pressure Chart

Display	Pressure	Display	Pressure	Display	Pressure	Display	Pressure
0	0	32	19	64	38	96	56
1	1	33	19	65	38	97	57
2	1	34	20	66	39	98	58
3	2	35	21	67	39	99	58
4	2	36	21	68	40	100	59
5	3	37	22	69	41	101	59
6	4	38	22	70	41	102	60
7	4	39	23	71	42	103	61
8	5	40	24	72	42	104	61
9	5	41	24	73	43	105	62
10	6	42	25	74	44	106	62
11	6	43	25	75	44	107	63
12	7	44	26	76	45	108	64
13	8	45	26	77	45	109	64
14	8	46	27	78	46	110	65
15	9	47	28	79	46	111	65
16	9	48	28	80	47	112	66
17	10	49	29	81	48	113	66
18	11	50	29	82	48	114	67
19	11	51	30	83	49	115	68
20	12	52	31	84	49	116	68
21	12	53	31	85	50	117	69
22	13	54	32	86	51	118	69
23	14	55	32	87	51	119	70
24	14	56	33	88	52	120	71
25	15	57	34	89	52	121	71
26	15	58	34	90	53	122	72
27	16	59	35	91	54	123	72
28	16	60	35	92	54	124	73
29	17	61	36	93	55	125	74
30	18	62	36	94	55	126	74
31	18	63	37	95	56	127	75

continued on next page

Table 2 (continued). Gravitron Display/Pressure Chart

Display	Pressure	Display	Pressure	Display	Pressure	Display	Pressure
128	75	160	94	192	113	224	132
129	76	161	95	193	114	225	132
130	76	162	95	194	114	226	133
131	77	163	96	195	115	227	134
132	78	164	96	196	115	228	134
133	78	165	97	197	116	229	135
134	79	166	98	198	116	230	135
135	79	167	98	199	117	231	136
136	80	168	99	200	118	232	136
137	81	169	99	201	118	233	137
138	81	170	100	202	119	234	138
139	82	171	101	203	119	235	138
140	82	172	101	204	120	236	139
141	83	173	102	205	121	237	139
142	84	174	102	206	121	238	140
143	84	175	103	207	122	239	141
144	85	176	104	208	122	240	141
145	85	177	104	209	123	241	142
146	86	178	105	210	124	242	142
147	86	179	105	211	124	243	143
148	87	180	106	212	125	244	144
149	88	181	106	213	125	245	144
150	88	182	107	214	126	246	145
151	89	183	108	215	126	247	145
152	89	184	108	216	127	248	146
153	90	185	109	217	128	249	146
154	91	186	109	218	128	250	147
155	91	1878	110	219	129	251	148
156	92	188	111	220	129	252	148
157	92	189	111	221	130	253	149
158	93	190	112	222	131	254	149
159	94	191	112	223	131	255	150

Table 3. Gravitron Air Pressure Chart

Weight(lbs)	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
50	48.34	47.41	46.48	45.55	44.62	43.69
60	51.69	50.57	49.46	48.34	47.22	46.11
70	55.04	53.73	52.43	51.13	49.83	48.53
80	58.38	56.90	55.41	53.92	52.43	50.94
90	61.73	60.06	58.38	56.71	55.04	53.36
100	65.08	63.22	61.36	59.50	57.64	55.78
110	68.43	66.38	64.34	62.29	60.24	58.20
120	71.78	69.54	67.31	65.08	62.85	60.62
130	75.12	72.71	70.29	67.87	65.45	63.03
140	78.47	75.87	73.26	70.86	68.06	65.45
150	81.82	79.03	76.24	73.45	70.66	67.87
160	85.17	82.19	79.22	76.24	73.26	70.29
170	88.52	85.35	82.19	79.03	75.87	72.71
180	91.86	88.52	85.17	81.82	78.47	75.12
190	95.21	91.68	88.14	84.61	81.08	77.54
200	98.56	94.84	91.12	87.40	83.68	79.96
210	101.91	98.00	94.10	90.19	86.28	82.38
220	105.26	101.16	97.07	92.98	88.89	84.80
230	108.60	104.33	100.05	95.77	91.49	87.21
240	111.95	107.49	103.02	98.56	94.10	89.63
250	115.30	110.65	106.00	101.35	96.70	92.05
260	118.65	113.81	108.98	104.14	99.30	94.47
270	122.00	116.97	111.95	106.93	101.91	96.89
280		120.14	114.93	109.72	104.51	99.30
290			117.90	112.51	107.12	101.72
300			120.88	115.30	109.72	104.14
310				118.09	112.32	106.56
320				120.88	114.93	108.98
330					117.53	111.39
340					120.14	113.81
350						116.23
360						118.65
370						121.07
380						
390						
400						
410						
420						
430						
440						
450						
460						
470						
480						
490						
500						
510						
520						
530						
540						
550						

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Table 3 (continued). Gravitron Air Pressure Chart

Weight(lbs)	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12
50	42.76	41.83	40.90	39.97	39.04	38.11
60	44.99	43.88	42.76	41.64	40.53	40.71
70	47.22	45.92	44.62	43.32	42.02	40.71
80	49.46	47.97	46.48	44.99	43.50	42.02
90	51.69	50.01	48.34	46.67	44.99	43.32
100	53.92	52.06	50.20	48.34	46.48	44.62
110	56.15	54.11	52.06	50.01	47.97	45.92
120	58.38	56.15	53.92	51.69	49.46	47.22
130	60.62	58.20	55.78	53.36	50.94	48.53
140	62.85	60.24	57.64	55.04	52.43	49.83
150	65.08	62.29	59.50	56.71	53.92	51.13
160	67.31	64.34	61.36	58.38	55.41	52.43
170	69.54	66.38	63.22	60.06	56.90	53.73
180	71.78	68.43	65.08	61.73	59.38	55.04
190	74.01	70.47	66.94	63.41	59.87	56.34
200	76.24	72.52	68.80	65.08	61.36	57.64
210	78.47	74.57	70.66	66.75	62.85	58.94
220	80.70	76.61	72.52	68.43	64.34	70.24
230	82.94	78.66	74.38	70.10	65.82	61.55
240	85.17	80.70	76.24	71.78	67.31	62.85
250	87.40	82.75	78.10	73.45	68.80	64.15
260	89.63	84.80	79.96	75.12	70.29	65.45
270	91.86	86.84	81.82	76.80	71.78	66.75
280	94.10	88.89	83.68	78.47	73.26	68.06
290	96.33	90.93	85.54	80.15	74.75	69.36
300	98.56	92.98	87.40	81.82	76.24	70.66
310	100.79	95.03	89.26	83.49	77.73	71.96
320	103.02	97.07	91.12	85.17	79.22	73.26
330	105.26	99.12	92.98	86.84	80.70	74.57
340	107.49	101.16	94.84	88.52	82.19	75.87
350	109.72	103.21	96.70	90.19	83.68	77.17
360	111.95	105.26	98.56	91.86	85.17	78.47
370	114.18	107.30	100.42	93.54	86.66	79.77
380	116.42	109.25	102.28	95.21	88.14	81.08
390	118.65	111.39	104.14	96.89	89.63	82.38
400	120.88	113.44	106.00	98.56	91.12	83.68
410		115.49	107.86	100.23	92.61	84.98
420		117.53	109.72	101.91	94.10	86.28
430		119.58	111.58	103.58	95.58	87.59
440		121.62	113.44	105.26	97.07	88.89
450			115.30	106.93	98.56	90.19
460			117.16	108.60	100.05	91.49
470			119.02	110.28	101.54	92.79
480			120.88	111.95	103.02	94.10
490				113.63	104.51	95.40
500				115.30	106.00	96.70
510				116.97	107.49	98.00
520				118.65	108.98	99.30
530				120.32	110.46	100.61
540					111.95	101.91
550					113.44	103.21

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Table 3 (continued). Gravitron Air Pressure Chart

Weight(lbs)	Level 13	Level 14	Level 15	Level 16	Level 17
50	37.18	36.25	35.32	34.39	33.46
60	38.30	37.18	36.06	34.95	33.83
70	39.41	38.11	36.81	35.51	34.20
80	40.53	39.04	37.55	36.06	34.58
90	41.64	39.97	38.30	36.62	34.95
100	42.76	40.90	39.04	37.18	35.32
110	43.88	41.83	39.78	37.74	35.69
120	44.99	42.76	40.53	38.30	36.08
130	46.11	43.69	41.27	38.85	36.44
140	47.22	44.62	42.02	39.41	36.81
150	48.34	45.55	42.76	39.97	37.18
160	49.46	46.48	43.50	40.53	37.55
170	50.57	47.41	44.25	41.09	37.92
180	51.69	48.34	44.99	41.64	38.30
190	52.80	49.27	45.74	42.20	38.67
200	53.92	50.20	46.48	42.76	39.04
210	55.04	51.13	47.22	43.32	39.41
220	56.15	52.06	47.97	43.88	39.78
230	57.27	52.99	48.71	44.43	40.16
240	58.38	53.92	49.46	44.99	40.53
250	59.50	54.85	50.20	45.55	40.90
260	60.62	55.78	50.94	46.11	41.27
270	61.73	56.71	51.69	46.67	41.64
280	62.85	57.64	52.43	47.22	42.02
290	63.96	58.57	53.18	47.78	42.39
300	65.08	59.50	53.92	48.34	42.76
310	66.20	60.43	54.66	48.90	43.13
320	67.31	61.36	55.41	49.46	43.50
330	68.43	62.29	56.15	50.01	44.88
340	69.54	63.22	56.90	50.57	44.25
350	70.66	64.15	57.64	51.13	44.62
360	71.78	65.08	58.38	51.69	44.99
370	72.89	66.01	59.13	52.25	45.36
380	74.01	66.94	59.87	52.80	45.74
390	75.12	67.87	60.62	53.36	46.11
400	76.24	68.80	61.36	53.92	46.48
410	77.36	69.73	62.10	54.48	46.85
420	78.47	70.66	62.85	55.04	47.22
430	79.59	71.59	63.59	55.59	47.60
440	80.70	72.52	64.34	56.15	47.97
450	81.82	73.45	65.08	56.71	48.34
460	82.94	74.38	65.82	57.27	48.71
470	84.05	75.31	66.57	57.83	49.08
480	85.17	76.24	67.31	58.38	49.46
490	86.28	77.17	68.06	58.94	49.83
500	87.40	78.10	68.80	59.50	50.20
510	88.52	79.03	69.54	60.06	50.57
520	89.63	79.96	70.29	60.62	50.94
530	90.75	80.89	71.03	61.17	51.32
540	91.86	81.82	71.78	61.73	51.69
550	92.98	82.75	72.52	62.29	52.06

GAIN ADJUSTMENT

The air pressure is measured by the transducer. The transducer requires an extremely accurate +5VDC for input power but produces an output signal that is only about 60 millivolts (60/1000 volt) for a full-scale reading. This small range is far below the ability of the computer to interpret signal levels accurately. Therefore, signal amplification is needed to amplify the 0 to 60 mV signal up to a range of 0 to 5 volts, where the computer can read the signal and calculate the air pressure. Signal amplification occurs in the power module to avoid long wire runs directly to the computer for the very low signal level from the transducer.

The amplifier in the power module requires two adjustments in order to maintain the accuracy required for consistent workouts: zero offset and gain (also known as scale, since it essentially multiplies the transducer output times a scale factor). Zero offset is a coarse adjustment that has already been made in software. Gain is the only adjustment with external access (screwdriver control on the power module) and it must be set with extreme accuracy.

The computer uses an eight-bit analog-to-digital converter (adc). Eight binary bits will represent a number from 0 to 255. The gain adjustment sets 150 psi equal to 5 volts, and the processor would read this as the number 255. So zero pressure equals the number 0; 75 psi equals number 128; and the maximum normal pressure, 120 psi, equals number 204. The numbers from the processor are displayed in the WORKOUT WEIGHT window of the console when testing air pressure (refer to the "Leak Test", pages 6-7). Table 2 lists the system pressure in psi (rounded to the nearest whole number) that is present for each of the 256 possible numbers in the Display.

The adjustable amplifier gain in the power module is provided to ensure that users obtain an accurate workout. This adjustment is available on units manufactured after May 15, 1989. If your power module does not have the gain adjustment, you may wish to contact StairMaster Exercise Systems to obtain one that does.

To adjust the amplifier gain if your Gravitron Upper Body System does have an air pressure gauge:

1. Check the gauge for a zero indication when the system is depressurized. If necessary, adjust the gauge indication so that the pointer rests at the scale zero.
 - a. Press 2020 ENTER ENTER to turn the compressor on. The platform will rise unless there is some weight on it.
 - b. When the air pressure gauge reads 75 psi, press ENTER to turn off the compressor.
 - c. Adjust the screwdriver control on the bottom of the power module to make the display in the WORKOUT WEIGHT window read 128.
 - d. Press CLEAR to actuate the solenoid valve and depressurize the system.
2. To adjust the amplifier gain if your Gravitron Upper Body System does not have an air pressure gauge:
 - a. Place a 100-pound weight on the platform.
 - b. Press the red ON/OFF switch to turn on the system.
 - c. Program a weight of 200 pounds into the console for a workout. (Press 200 and ENTER on the keypad.)
 - d. Program a difficulty level of 9 into the console. (Press 9 and ENTER on the keypad.)
 - e. The platform should rise and stay half way up. If it rises beyond half way, less assist is required. If it fails to rise to half way, this indicates that more assist is required.

- f. Press the red ON/OFF switch to depressurize the system and end the test. The platform will move down to floor level.



CAUTION

Before you make any adjustment on the power module, the machine must be depressurized and the platform must be on the floor.

- g. If the machine needs more assist, turn the adjustment screw on the power module counterclockwise. If the machine needs less assist, turn the adjustment screw clockwise.



CAUTION

When adjusting, do not over-turn the adjustment screw or you may damage the power module.

- h. Repeat steps b through g as often as necessary to obtain the proper lift of the 100-pound weight.

GENERAL TROUBLESHOOTING TIPS

1. Since many of the components on the Gravitron are dependent on one another to function properly, occasionally the best way to troubleshoot a problem is to replace components one at a time until the problem is corrected. If after replacing a component the problem is not corrected, be sure to put the original part back on the machine. This will ensure that additional problems are not introduced.
2. To check a solenoid valve, plug it directly into a 115-volt wall outlet. It should click when plugged in and click again when unplugged.
3. To check a compressor, disconnect its air outlet and connect the power plug directly into a 115-volt wall outlet. When it is disconnected from the system, the compressor should operate as long as it is connected to the power source.
4. Mechanical problems may not always be as obvious as one might expect. Friction in the lift mechanism may appear to the technician as a bad transducer (machine is too hard to use). If the gain adjustment in the power module has been performed and the machine is still too hard to use, the lift mechanism has a friction problem.
5. Pneumatic system problems are fairly easily diagnosed. It is easy to determine that a leak is occurring by using the 2020 ENTER ENTER procedure, but isolating the specific cause may be difficult. Leaks may be found by placing a soapy solution over all connection points in the pneumatic system and watching for bubbles.

SPECIFIC TROUBLESHOOTING TIPS

When troubleshooting, follow the instructions in precisely the same order as listed in each section.

1. Console resets during workout.

- Static charge problem. Be sure the ground strap is installed. Place the machine on a rubber mat.
- Is the gray cable (console to power module) secure?
- Replace the console.

2. Compressor comes on when no one is using the machine.

- Static charge problem. Be sure the ground strap is installed. Place machine on a rubber mat.
- Replace the power module.
- Replace the console.
- Replace the console gray cable.

3. Console locks up indefinitely and may display random dots.

- Reset power module.
- Static charge problem. Make sure ground strap is installed. Place machine on a rubber mat.
- Replace the console.
- Replace the power module.
- Replace the console gray cable.

4. Machine wobbles and is unstable during use.

- Machine needs to be leveled, using the leveling adjustment on the back of the machine.

5. Safety valve does not catch platform above level 12 or so.

- This is normal, there is not enough platform speed to engage the safety valve at some higher levels. The condition should still be safe due to the slow platform speeds.

6. Machine will not accept "Clear" for pyramiding during workout.

- Wait 10 seconds for system to reset and press Clear again.
- The pneumatic system has a leak that must be repaired.
- Defective keypad on the console. Replace the console.

7. When programmed for higher levels the platform will not rise after compressor shuts off.

- Is user programming the correct weight?
- Power module not "gain" adjusted. See instructions on page 34 for Gain Adjustments.
- Console probably has Revision 1.2 software in it. If so, replace the console. (To determine which revision level is in the console, press 107 and ENTER; the revision level shows in the MINUTES window.)
- Replace the power module.

8. Unit has far too much assist for the level selected.

- Power module not "gain" adjusted. See instructions on page 34 for Gain Adjustments.
- Replace the transducer.
- Console probably has Revision 1.2 software in it. If so, replace the console. (To determine which revision level is in the console, press 107 and ENTER; the revision level shows in the MINUTES window.)

9. Unit has far too little assist for the level selected.

- Power module not "gain" adjusted. See instructions on page 34 for Gain Adjustments.
- Friction problem (see Lubrication, page 25).
- Transducer and power module mismatch (see Compatability, page 45)
- Air leak. Run leak test (see page 6). If leak test is ok, replace transducer.

10. Platform catches properly at no more than 12" on safety valve test, but user complains about it catching during workout.

- User working out too fast. Educate users on correct workout pace and reasons why.

11. Air cylinder squeaking and may have brass shavings around top.

- Check to see if felt wick modification has been made on cylinder. If so, lubricate the wick with automatic transmission fluid (Dex-tron). Apply only 10 to 12 drops on the wick. If the cylinder has a nylon bushing, do not lubricate.
- If brass shavings are present, replace the cylinder.

12. Unit leaks air sometimes but works fine at other times.

- Replace the solenoid valve - not always closing.
- Replace the check valve - not always closing.
- Worn air cylinder contaminated with brass shavings. Replace the cylinder.

13. Compressor shuts off before reaching programmed level.

- Air leak. Console will shut off compressor if the accumulator pressure does not drop off the top bar graph light in 20 seconds. The console will relight after another 10 seconds.
- Replace the transducer.

14. Frequent leaks between compressor and check valve.

- The mechanical lift is hitting a hose during operation, usually at or near floor level.

15. Air cylinder has no top or bottom cushion.

- Cylinder has a bad internal check valve. Replace cylinder.

16. Machine loses pressure during a work-out.

- Air leak. Run leak test (see page 6).
- If a leak cannot be found, replace the check valve.

17. Unit has an air leak that can't be found.

- Check all the not so obvious locations. For example, check the solenoid valve exhaust, the accumulator, and around the top of the cylinder O-Ring gland. To see if the cylinder seals are leaking, hold your finger over the cylinder exhaust port while checking the O-Ring gland.
- Defective check valve that lets air flow backwards from the accumulator tank to the compressor. Remove air filter from compressor and hold finger over inlet for several seconds to sense if pressure is backing up.
- Check around the compressor head fittings and gaskets. Check between the compressor and the check valve.

18. Platform sticking in the middle of levels 1 or 2.

- Is user inputting his weight correctly? Are other people having the same problem? If not, instruct user on proper data entry.
- Possibly too much mechanical friction. See Lubrication, page 25.

19. At end of workout or when machine is powered up, console flashes zeros four times.

- Power module must be Gain Adjusted (see page 34).
- Power module is too far out of zero adjust. Replace power module.

20. Compressor comes on and stays on when power is applied.

- Severe air leak. Run leak test (see page 6).
- Replace the bad transducer.
- Replace the power module.
- Check continuity of the console gray cable with a multimeter (gray cable runs from console to power module). Call the StairMaster Product Support Department (see page 54) if you need help checking continuity.

21. Compressor will not run at all.

- Connect compressor directly into a 115-volt wall outlet. If it doesn't work, replace it.
- If the compressor works when plugged into a 115-volt wall outlet, disconnect the console gray cable at the console. Insert a paper clip into holes 5 and 2 of the gray cable connector (the holes are numbered). The gray cable carries only 15 VDC so there is no danger of shock. If the compressor turns on, replace the console.
- Replace the power module.
- Replace the console gray cable.

22. The solenoid valve will not depressurize the system.

- Connect solenoid valve directly into a 115-volt wall outlet. If the solenoid valve does not operate, replace the valve.
- If the solenoid valve operates when connected to a 115-volt wall outlet, disconnect the console gray cable at the console. Insert a paper clip into holes 5 and 3 of the gray cable (the holes are numbered). The gray cable carries only 15 VDC so there is no danger of shock. If the solenoid valve operates, replace the console.
- Replace the power module.
- Replace the console gray cable.

23. Solenoid valve stays open all the time.

- First disconnect the valve from the power module and check whether the machine will pressure up. If the machine does not pressure up when the valve is disconnected, replace the valve.
- Pressurize the system with the valve disconnected. Disconnect the gray cable from the power module. Connect the valve back to the power module. If the system depressurizes, replace the power module.
- Pressurize the system with the valve disconnected. Disconnect the gray cable at the console. Connect the solenoid valve back to the power module. If the system depressurizes, replace the gray cable.
- Replace the console.

24. The red LED on the power module will not stay illuminated.

- Disconnect the console gray cable from the power module.
- Press the reset button on the GFI cord.
- If the problem still exists, press the reset button on the power module.
- If the problem still exists, disconnect the transducer from the power module. Press the reset buttons on the GFI cord and power module. If the power module LED stays illuminated, replace the transducer.
- If the problem still exists, replace the power module.

25. The Gravitron Upper Body System is getting progressively harder to use.

- Machine has an air leak which is gradually getting worse.

26. Machine is making squeaking noises.

- See Lubrication on page 25.

27. During the exercise routine, the bottom level of the platform is too high.

- Adjust the safety valve.
- If the safety valve is adjusted properly, replace the cylinder.

COMPATIBILITY

The Gravitron Upper Body System transducers originally operated on 10 volts DC. This was known as the Barksdale system. The current transducer operates on 5 volts DC. This is a Media Mate system and was installed on all units manufactured after May 1, 1988. The Barksdale and Media Mate are not interchangeable. All Gravitron Upper Body Systems should be retrofitted to the Media Mate system. To determine which system is on machine, check the following:

1. The transducer's brand name will be either Barksdale or Media Mate.
2. Take a voltage reading on the power module. Set the volt meter on the lowest DC voltage scale above 10 volts. As you look at the back of the power module, place the positive lead on the lower left pin on the transducer plug. Place the negative lead on the metal surface of the transducer plug.
 - a. If the meter reads 10 volts DC, the transducer required is a Barksdale and the system should be retrofitted to a Media Mate system. Contact StairMaster Exercise Systems for details (see page 54).
 - b. If the meter reads 5 volts DC, the required transducer is a Media Mate.

RECOMMENDED UPGRADING

No Gravitron Upper Body System should have a plastic accumulator tank. All machines must be retrofitted to have a metal accumulator tank. All machines manufactured after October 18, 1988, have the metal tank. If a machine has a plastic tank, take the unit out of service immediately and replace the plastic tank with a metal tank.

All Gravitron Upper Body System consoles should have the Revision 1.4 software. All consoles manufactured after October 18, 1988, have revision 1.4 software. To determine which revision level is in the console, press 107 and ENTER. The revision level will be displayed in the MINUTES window.

PARTS REPLACEMENT

GRAVITRON TOOL LIST

1. One set combination internal/external snap ring pliers with 90-degree bent tips.
2. One set snap ring pliers with straight tips.
3. One rubber mallet.
4. One adjustable 10" wrench.
5. One standard hex key set, sizes 1/16" - 1/2".
6. 3/8" drive deep socket set.
7. One 16 oz. ball peen hammer.
8. Three Phillips screwdrivers, sizes #1, #2 and #4.
9. Three slotted screwdrivers, blade sizes 1/8", 1/4" and 5/16".
10. One 3/4" x 5" bolt (used to drive axles out of flanges).
11. One voltage multimeter.
12. One pair locking pliers.
13. Voltmeter.

REPLACING THE ACCUMULATOR TANK

Ensure that the tank is depressurized!

1. Unplug G.F.I. (yellow) cord from wall outlet.
2. Lift power module out of metal securing bracket.
3. Unplug solenoid valve, transducer and compressor from power module.
4. Remove the air hose from the check valve by removing the hose clamp and pulling or cutting the hose off the hose barb. If you cut the hose too short, you may have to replace the hose.
5. Remove the air hose from the safety valve and air cylinder.
6. Remove the two anchor bolts (7/16" hex head) securing accumulator tank to frame of machine.
7. Carefully remove accumulator assembly from machine.
8. Remove all valves from accumulator tank and install them on replacement tank, being sure not to overtighten. (See instruction on page 53 for transducer replacement - transducer can be damaged easily during installation.) When installing the air hoses on the check valve, the safety valve, and the air cylinder, be sure that the hoses are completely on the hose barbs.
9. Install accumulator assembly using reverse procedure.

REPLACING THE ACCUMULATOR ASSEMBLY

1. Follow steps #1 through #7 and #9 of the Accumulator Tank Replacement procedures (refer to page 47).

REPLACING THE AIR COMPRESSOR

1. Unplug G.F.I. (yellow) cord from wall outlet.
2. Raise the power module in the metal securing bracket.
3. Unplug air compressor from power module.
4. Remove the 1/4" hose from compressor by removing the hose clamp and pulling or cutting the hose barb off the hose. If you cut the hose too short, you may have to replace the hose.
5. Remove the four anchoring nuts (1/2") securing compressor to frame.
6. Carefully remove the compressor.
7. When installing the air hose on the compressor, be sure that the air hose is completely on the hose barb. Install the replacement compressor by simply reversing the aforementioned procedures.

REPLACING THE AIR CYLINDER

Ensure that the system is depressurized!

1. Unplug G.F.I. (yellow) cord from wall outlet.
2. Position yourself at rear of machine.
3. Remove the hose running from the air cylinder to the safety valve by removing the hose clamps and pulling or cutting the hose off the hose barb. If you cut the hose too short, you may have to replace the hose.
4. Remove two clevis pins from cylinder mounts (one at the top and one at the bottom).
5. Carefully remove air cylinder from machine.
6. Install replacement cylinder by reversing the procedures. When installing the air hose on the safety valve and the air cylinder, be sure that the hose is completely on the hose barb.

REPLACING THE CHECK VALVE

Ensure that the system is depressurized!

1. Unplug G.F.I. (yellow) cord from wall outlet.
2. Remove the hose connecting the check valve to air compressor by removing the hose clamp and pulling or cutting the hose off the hose barb. If you cut the hose too short, you may have to replace the hose.
3. Using 5/8" wrench, carefully remove check valve from accumulator tank.
4. Install replacement check valve using reverse procedure.
5. If you use a thread sealer when installing the check valve, be sure no sealer is placed on the threads that will be exposed on the inside of the accumulator tank. The sealer may fall into the tank and affect the operation of the transducer, safety valve or solenoid valve. When installing the air hose on the check valve and the air compressor, be sure that the hose is completely on the hose barb.

REPLACING THE CONSOLE

1. Unplug G.F.I. (yellow) cord from wall outlet.
2. Unscrew and unplug gray cable from back of console.
3. Remove the two console knobs from back of console.
4. Install new console using reverse procedure.

REPLACING THE POWER MODULE

1. Unplug G.F.I. (yellow) cord from wall outlet.
2. Lift power module out of metal securing bracket.
3. Unplug console gray cable, solenoid valve cord, transducer cord and compressor cord from back of power module.
4. Install replacement power module using reverse procedure.
5. Check the transducer compatibility (see page 45).
6. Check the system gain adjustment (see page 34).

REPLACING THE SAFETY VALVE

Ensure that the system is depressurized!

1. Unplug G.F.I. (yellow) cord from wall outlet.
2. Remove the hose connecting the safety valve to the air cylinder by removing the hose clamp and pulling or cutting the hose off the hose barb. If you cut the hose too short, you may have to replace the hose.
3. Using 9/16" wrench, carefully remove safety valve from accumulator tank.
4. Install replacement safety valve using reverse procedure.
5. If you use a thread sealer when installing the safety valve, be sure no sealer is placed on the threads that will be exposed on the inside of the accumulator tank. The sealer may fall into the tank and affect the operation of the transducer, safety valve or solenoid valve. When installing the air hose on the safety valve and the air compressor, be sure that the hose is completely on the hose barb.

REPLACING THE SOLENOID VALVE

Ensure that the system is depressurized!

1. Unplug G.F.I. (yellow) cord from wall outlet.
2. Lift power module out of metal securing bracket.
3. Unplug solenoid valve from back of power module.
4. Using 9/16" wrench, carefully remove solenoid valve from accumulator tank.
5. Install replacement solenoid valve using reverse procedure.
6. If you use a thread sealer when installing the solenoid valve, be sure no sealer is placed on the threads that will be exposed on the inside of the accumulator tank. The sealer may fall into the tank and affect the operation of the transducer, safety valve, or solenoid valve.

REPLACING THE TRANSDUCER

Ensure that the system is depressurized!

1. Unplug G.F.I. (yellow) cord from wall outlet.
2. Lift power module out of metal securing bracket.
3. Unplug transducer from power module.
4. Very carefully remove the transducer from accumulator tank using a 9/16" wrench. **Caution: Transducer is easily knocked out of calibration. Keep hands off of it as much as possible.**
5. Be sure the replacement transducer is compatible with the power module (see page 45).
6. Install replacement transducer using reverse procedure. Be very careful not to move the black boot. Start the thread by hand and use a wrench as soon as possible to complete the threading and snug-down.
7. If you use a thread sealer when installing the transducer, be sure no sealer is placed on the threads that will be exposed on the inside of the accumulator tank. The sealer may fall into the tank and affect the operation of the transducer, safety valve, or solenoid valve.

APPENDIX

TO ORDER PARTS & OBTAIN TROUBLESHOOTING HELP

Have the following information available before you contact your representative: serial numbers, the console Rev., and the date of purchase.

In the United States

StairMaster Exercise Systems
6015 North Xanthus Avenue
Tulsa, Oklahoma 74130, U.S.A.
(918) 425-5588; (800) 331-3578
FAX: (918) 425-4852

In Canada

RANDAL Sports/Medical Products (Canada), Inc.
109 Woodbine Downs Blvd. #9
Etobicoke, ON
Canada M9W 6Y1
(416) 746-5105

In Europe

RANDAL Europe SA
Sports/Medical Products
Via S. Gottardo 25
CH - 6943 Vezia
Switzerland
(49) 091-57-47-*14 (*also -15)
FAX: (41) 091-57-47-16

In Japan

Senoh Corporation
2-4 Kandatamachi
Chiyoda-Ku, Tokyo
Japan 101
81-03-254-6821

Countries Not Listed Above

RANDAL Sports/Medical Products, Inc., International Division
12421 Willows Road N.E., Suite 135
Kirkland, Washington 98034 U.S.A.
(206) 823-1825; (800) 635-2936
FAX: (206) 820-7505

INFORMATION NEEDED TO EXPEDITE YOUR ORDER

To expedite the shipment of parts orders, please have the following information available at the time the order is placed:

1. Name (Facility or Individual)
2. Complete Mailing Address (Including ZIP Code)
3. Contact Person and Telephone Number
4. Serial Number of Machine
5. Detailed Description of the Problem

If you find it necessary to return electronic components to us for repair, please call the Product Support Department to let us know which part is being sent and also enclose a complete description of the problem. This will help our technicians to repair the part quickly and minimize your downtime.

IF YOUR MACHINE IS UNDER WARRANTY, PLEASE REMEMBER TO RETURN TO THE FACTORY ALL OLD PARTS THAT ARE TAGGED WITH A WARRANTY CARD TO AVOID BEING CHARGED FOR THE NEW PARTS.

LIST OF CODES

015 ENTER	Turns on all LEDs to test console display; turns on all 17 bar graph segments; turns on decimal point in MINUTES window.
107 ENTER	Displays the type of computer chip in the console.
2020 ENTER	Turns on the console WORKOUT WEIGHT window display:
2020 ENTER ENTER	Turns on WEIGHT window and turns on compressor.
2020 ENTER ENTER ENTER	Turns on WEIGHT window; turns on compressor; turns off compressor. (Press CLEAR to relieve system pressure.)

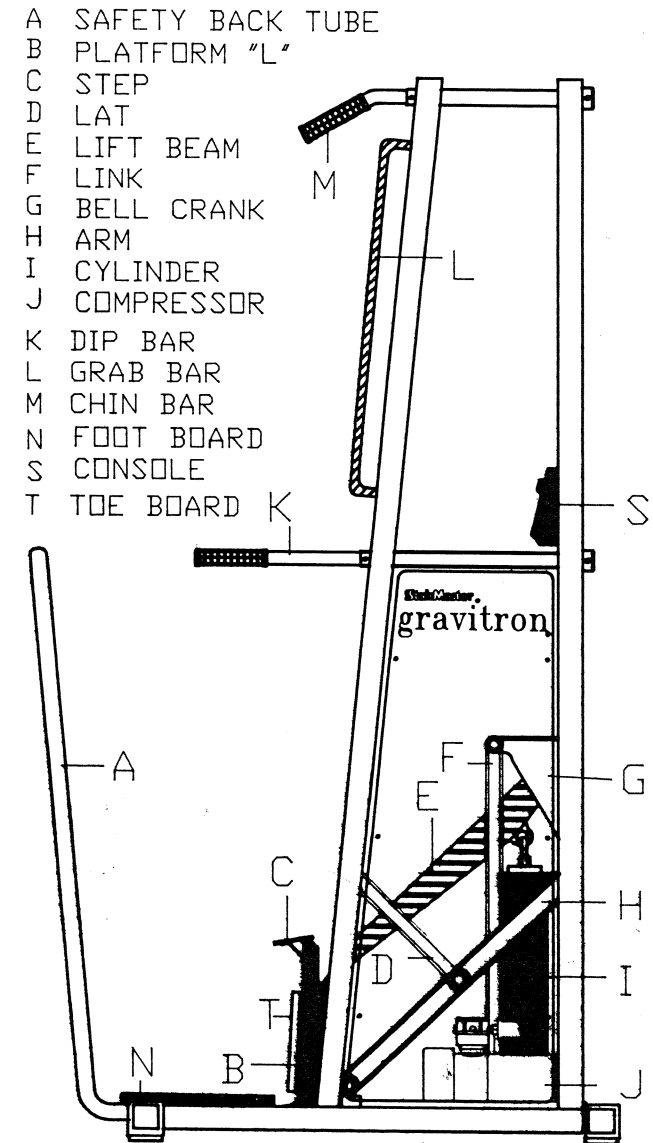


Figure 4: The Gravitrone Upper Body System - Side view

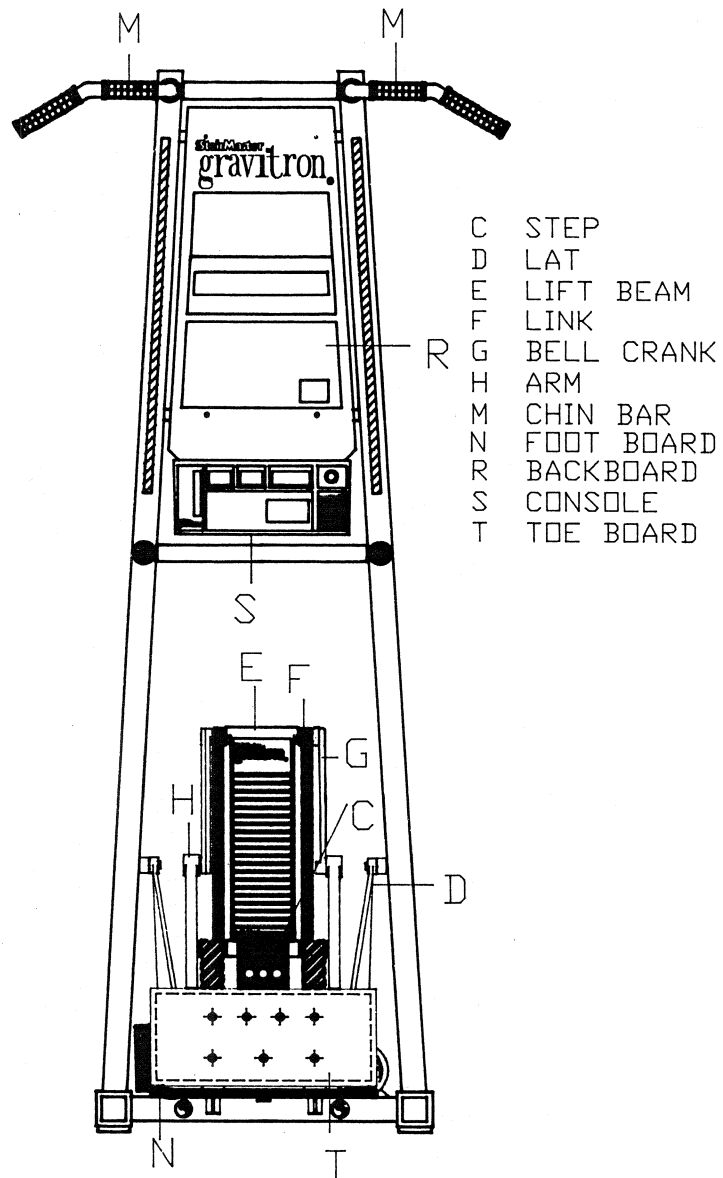


Figure 5: The Gravitrone Upper Body System - Front view

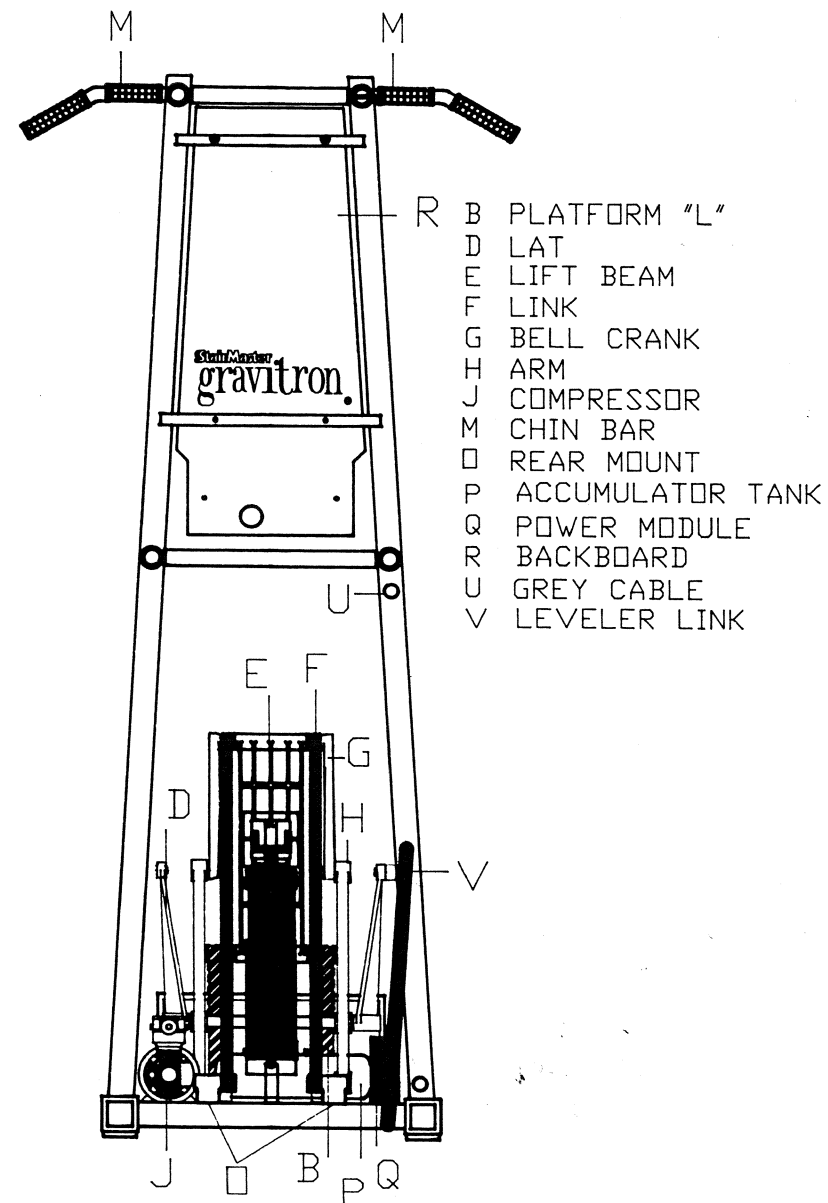


Figure 6: The Gravitrone Upper Body System - Rear view

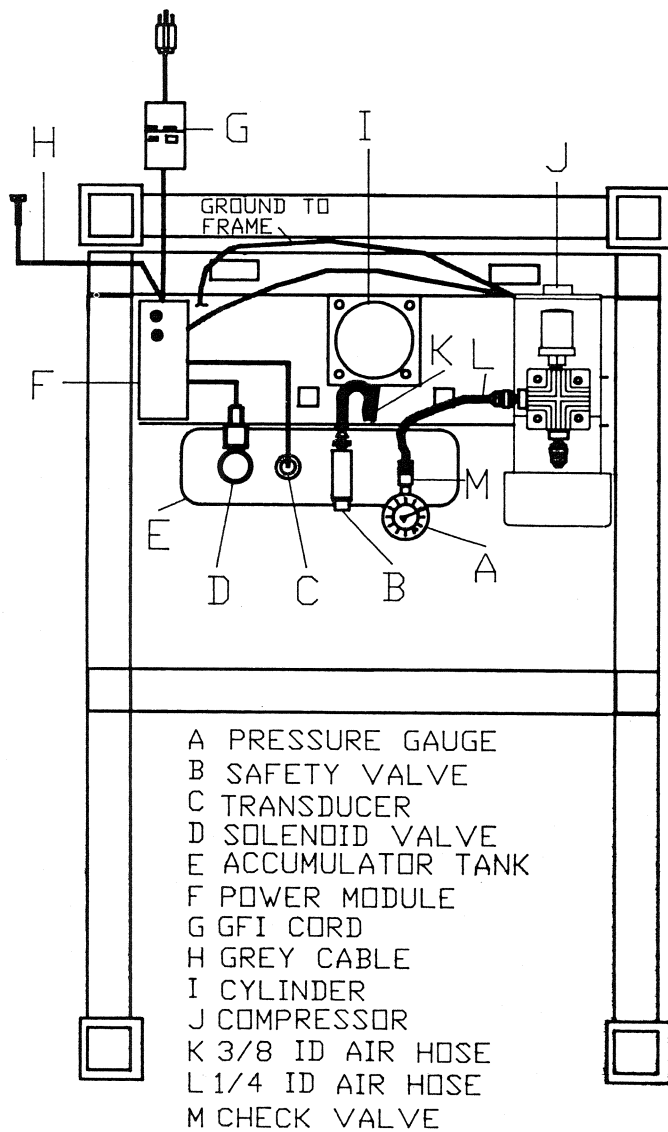


Figure 7: Parts Location - Electrical and Pneumatic

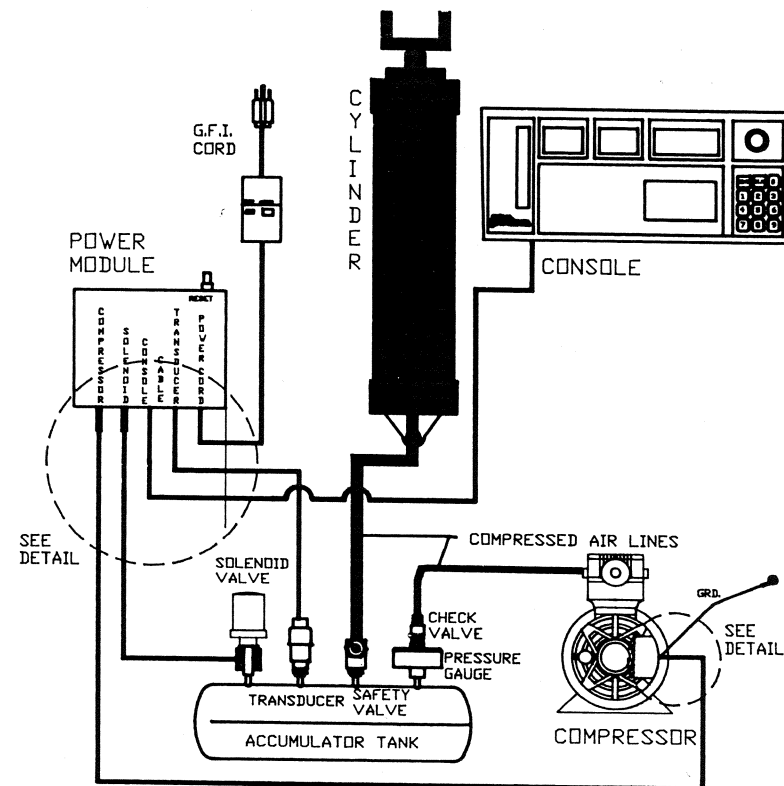


Figure 8: Electrical and Pneumatic Diagram

RANDAL® SPORTS/MEDICAL PRODUCTS, INC., UNITED STATES OFFICES

RANDAL Sports/Medical Products is the exclusive distributor for
StairMaster Exercise Systems.

Corporate Office

12421 Willows Road N.E., Suite 100
Kirkland, Washington 98034
(206) 823-1825; (800) 635-2936; FAX (206) 823-9490

East Division (MA, ME, CT, VT, NH, RI, NY, NJ, PA)

259 Route 17K
Newburgh, NY 12550
(914) 564-6011; (800) 772-0089; FAX (914) 564-8157

Midwest Division

Midwest Region (WI, MN, IL, IN, IA)
P.O. Box 519
West Chicago, IL 60186
(708) 231-5010; (800) 950-2814; FAX (708) 231-9197

Mid-America Region (KY, MI, OH, TN, WV)

P.O. Box 497
Twinsburg, OH 44087
(216) 425-4833; (800) 950-2814; FAX (216) 425-1829

West Division

West Region (CA, NV, AZ, CO, UT, NM, HI)
P.O. Box 5044-489
Thousand Oaks, CA 91359
(805) 495-6414; (800) 829-9993; FAX (805) 498-2314

Northwest Region (AK, ID, MT, OR, WA, WY)

12421 Willows Road N.E., Suite 125
Kirkland, WA 98034
(206) 820-7764; (800) 733-3783; FAX (206) 820-7505

Bay Region (Northern CA, Northern NV)

5627 Stoneridge Drive, Suite 314
Pleasanton, CA 95588
(415) 463-1181; (800) 829-9993; FAX (415) 463-1636

Southeast Division (DE, MD, DC, AL, FL, GA, MS, VA, NC, SC)

5572 Rio Vista Drive
Clearwater, FL 34620
(813) 531-5040; (800) 448-5040; FAX (813) 539-1342

Southwest Division (LA, TX, MO, KS, ND, SD, OK, NE, AR)

7030-G South Lewis
Tulsa, OK 74136
(918) 493-2099; (800) 777-4348; FAX (918) 494-6661

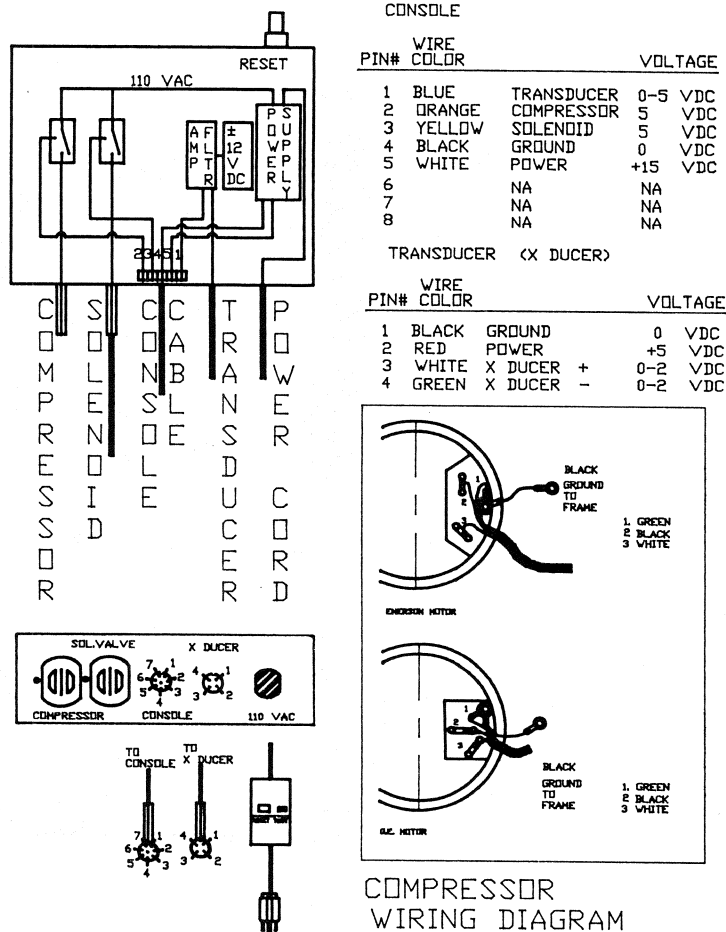


Figure 9: Electrical Detail