

# **BIOSTEP™ AND BIOSTEP™ CLINICAL PRO SEMI-RECUMBENT ELLIPTICAL**

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## **INSTALLATION/OPERATION MANUAL**

950-214  
950-215  
950-220  
950-245



# **BIODEX**

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# BIOSTEP™ AND BIOSTEP™ CLINICAL PRO SEMI-RECUMBENT ELLIPTICAL

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**This manual covers installation and operation procedures  
for the following BioStep™ Semi-Recumbent Elliptical products:**

#950-214	BioStep™, Clinical Pro, Japanese
#950-215	BioStep™, 115 VAC
#950-220	BioStep™, Clinical Pro, 115 VAC
#950-245	Stabilization Kit (Optional)

*NOTE: All or some of the following symbols, cautions, warnings and notes may apply to your BioStep and correspond to this operation manual:*

<b>Symbol</b>	<b>Meaning</b>
	Attention, consult accompanying documents.
	Symbol signification: Attention, se référer à la notice.
	Warning: Injuries to health may result from incorrect or excessive training.
	Attention, incorrect ou extrême entraînement peut aboutir des lésions au santé.

*NOTE: Circuit diagrams for this product are available upon request.*

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# 1. INTRODUCTION

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Designed for versatility and durability, the Biodex BioStep and BioStep Clinical Pro meet the demands of orthopedic, cardiopulmonary, sports medicine, wellness and general conditioning programs. Featuring a work range of 10 to 600 WATTS, plus self-powered, self-charging capability, the BioStep accommodates a wide variety of people and can be used virtually anywhere.

Software-driven for accurate reporting of real-time data, the BioStep features Constant Resistance Control while the BioStep Clinical Pro features both Isokinetic Speed Control *and* Constant Resistance Control. Because the internal battery is automatically recharged when work rates reach or exceed 30 WATTS and 50 RPM, both BioStep models can be used in the gym or at the clinic – without cumbersome power cords. An AC adapter is provided for use at work rates below 30 WATTS and 50 RPMs. Large wheels make the units easy to move.

Ergonomically designed and simple to operate, both BioSteps feature a step-through design for easy access. The contoured seat with lumbar support and an indexed track allows extensive front-to-back adjustment to ensure comfort, safety and biomechanically correct positioning. Both BioStep models accommodate users from 4'4" to 6'6" and weighing up to 500 pounds.

The easy-to-read, programmable LED display provides immediate user biofeedback for increased motivation and compliance. It maintains all settings and LED displays for 60 seconds after the workout is finished. Users can choose from quick-start operation that gets first-timers right into their exercise routine, or from five pre-programmed exercise profiles for each mode of operation. All profiles can be modified with the panel controls to provide a multitude of exercise programs to suit any individual's need. Heart Rate monitoring is provided through contact handgrips and Polar telemetry.

The Biodex BioSteps are available in two configurations: Standard and Clinical Pro. A stabilization kit including foot straps, a trunk stabilization belt, flip-up/flip-down seat arm rests, and EZ-Grip Handgrips for the adjustable arms is available for both models.

*NOTE: Throughout this manual the name BioStep is used to denote both the BioStep and BioStep Clinical Pro. For functions that differ between the two models, the specific model name is used.*

*NOTE: In a study designed to examine the test-retest reliability and concurrent criterion validity of  $VO_2^{max}$  on the BioStep in community-dwelling older adults, results provided preliminary evidence of reliable and valid estimates of oxygen consumption by the BioStep when compared with the criterion standard of direct  $VO_{2max}$  measurement in the sample.*

*Reference: Mendelsohn, M.E., Connelly, D.M., Overend, J.J., Petrella, R.J.:Reliability and validity of responses to submaximal all-extremity semi-recumbent exercise in older adults. Journal of Aging and Physical Activity, 2007, 15, 184-194.*

## 2. IMPORTANT SAFETY INSTRUCTIONS

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The Biodex BioStep and BioStep Clinical Pro have been designed and tested to safely provide superior function, results and years of use. Still, it is vital that you follow these important safety instructions at all times when using this device.

1. Read all instructions in this manual before using this device.
2. Use this device only for its intended use as described in this manual.
3. Except as instructed for use of the device, keep hands and feet away from all moving parts.
4. Do not use add-on's with this device, other than those recommended by Biodex Medical Systems, Inc.
5. Keep the electrical cord away from heated surfaces and out of all travel lanes.
6. Keep small children away from the pedals and arm cranks while the device is in use. Unsupervised children should never be allowed near this device.
7. This device must be level and stable on the floor before being used. See Chapter 3, Parts and Adjustments, for leveling instructions.
8. Establish a minimum of at least two feet of free space along the sides of unit to ensure unencumbered operation, easy access, and prevent possible injuries to non-users standing or walking nearby. Establish at least six inches of free space at the front and rear ends of the unit.
9. This device is designed for commercial use and will meet the demands of orthopedic, cardiopulmonary, sports wellness and general conditioning programs.
10. The surface under the BioStep should be stable and level.
11. Do not use this device outdoors while plugged in. Since the self-powered battery operation is low voltage, both the BioStep and BioStep Clinical Pro can be used outdoors only with self-powered battery operation.



**CAUTION:** For important additional safety considerations, see Chapter 10, Additional Considerations.

### GROUNDING INSTRUCTIONS

This product must be grounded. In the unlikely event that it may malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with local codes and ordinances.



**DANGER:** Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or Biodex Customer Service if you are in doubt as to whether the product is properly grounded. Do not attempt to modify the plug provided with the product. If the plug will not fit into the outlet, have a proper outlet installed by a qualified electrician.

If the BioStep is operated using the battery and no wall current, it is operating at low voltage (6-Volt Battery) and does not require grounding.

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## DIRECTIVES IMPORTANTES SUR LA SÉCURITÉ

Les appareils BioStep et BioStep Clinical Pro de Biodex ont été conçus et testés pour assurer en toute sécurité un fonctionnement et des résultats supérieurs ainsi que des années d'utilisation. Toutefois, il est crucial de porter en tout temps une attention particulière aux directives importantes qui suivent sur la sécurité, lorsqu'on utilise cet appareil.

1. Lire toutes les directives dans le présent manuel avant d'utiliser cet appareil.
2. N'utiliser l'appareil que pour son usage prévu comme décrit dans le manuel.
3. Sauf indication précise pour l'utilisation de l'appareil, garder les mains et les pieds éloignés des pièces en mouvement.
4. Ne pas utiliser d'accessoires avec cet appareil, à part ceux qui sont recommandés par Biodex Medical Systems, Inc.
5. Garder le cordon électrique éloigné de toute surface chauffée et de toute voie de circulation.
6. Éloigner les petits enfants des pédales et manivelles lorsque l'appareil est en cours d'utilisation. Il ne faut jamais laisser les enfants sans surveillance s'approcher de l'appareil.
7. Cet appareil doit être de niveau et stable sur le plancher avant son utilisation. On trouvera des directives de mise au niveau au chapitre 3 – Pièces et réglages.
8. Établir une zone libre d'au moins 90 cm (3 pi) le long des côtés de l'appareil pour lui assurer un fonctionnement sans gêne, en faciliter l'accès et prévenir des blessures possibles aux non-utilisateurs se tenant ou marchant à proximité. Établir une zone libre d'au moins 15 cm (6 po) aux extrémités avant et arrière de l'appareil.
9. Cet appareil est conçu pour utilisation commerciale. Il répond aux exigences des programmes orthopédiques, cardiopulmonaires, de mise en forme sportive et de conditionnement général.
10. La surface sous les appareils BioStep doit être stable et de niveau.
11. Ne pas utiliser l'appareil branché à l'extérieur. Le fonctionnement avec piles étant à basse tension, on peut utiliser les appareils BioStep et BioStep Clinical Pro à l'extérieur en mode de fonctionnement avec piles seulement.



**ATTENTION** – On trouvera des considérations supplémentaires importantes sur la sécurité au chapitre 10 – Considérations Supplémentaires.

## DIRECTIVES DE MISE À LA TERRE

Ce produit doit être mis à la terre. Dans l'éventualité peu probable où il subisse une panne ou une défaillance, la mise à la terre fournit une voie de moindre résistance pour le courant électrique, réduisant ainsi le risque de choc électrique. Ce produit est équipé d'un cordon ayant un conducteur de protection et une fiche de mise à la terre. On doit brancher la fiche dans une prise appropriée installée et mise à la terre en conformité avec les codes et règlements en vigueur.



**DANGER** – Le mauvais branchement du conducteur de protection peut entraîner un risque de choc électrique. Consulter un électricien qualifié ou le service après-vente Biodex en cas de doute sur la mise à la terre appropriée du produit. Il est déconseillé d'essayer de modifier la fiche fournie avec le produit. Si la fiche n'entre pas dans la prise, faire installer une prise appropriée par un électricien qualifié.

Lorsque l'appareil BioStep fonctionne au moyen de la pile et sans courant de secteur, il fonctionne à basse tension (pile de 6 V) et ne nécessite pas de mise à la terre.

### 3. PARTS AND ADJUSTMENTS

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(Refer to Figure 1.)

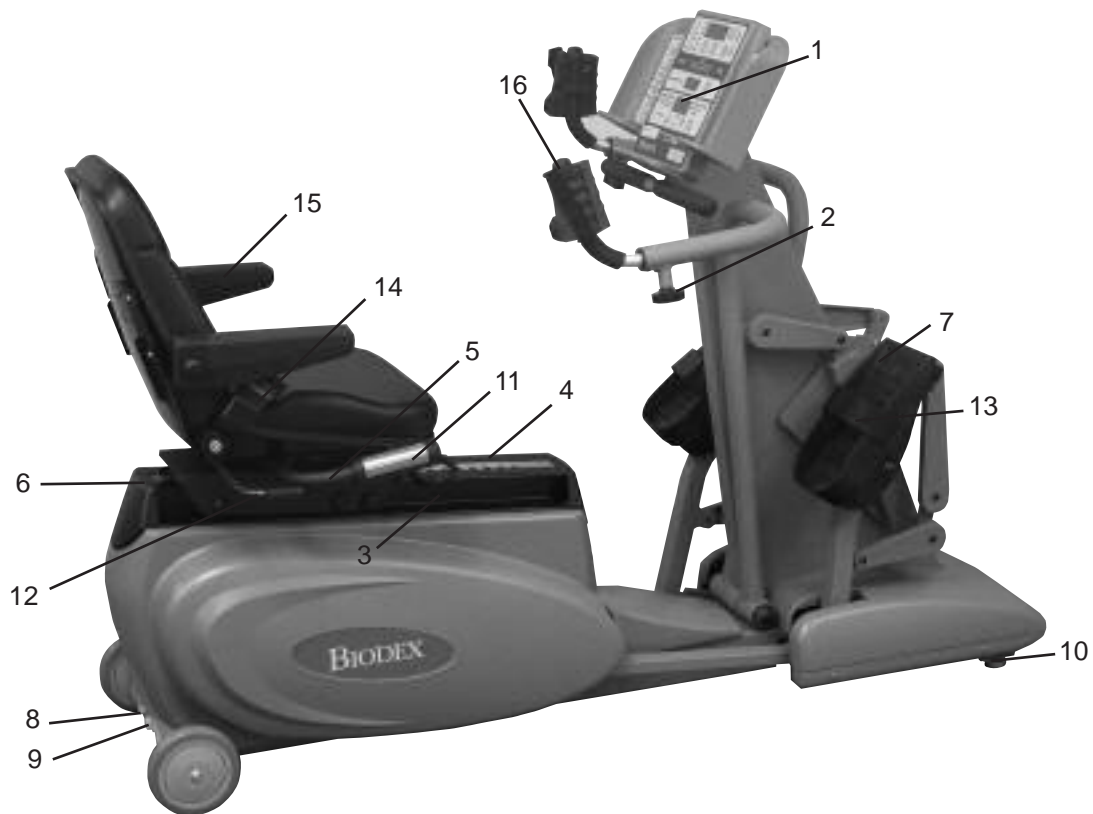


Figure 1: Parts and adjustment mechanisms.

The BioStep and BioStep Clinical Pro includes the following parts and adjustment mechanisms:

1. Display panel
2. Adjustable arms
3. Seat front-to-back release handle
4. Seat front-to-back scale
5. Fixed support handles
6. Rear seat stop
7. Footplate
8. RS-232 Jack
9. Battery recharge jack/AC adapter
10. Leveling guides
11. Heart rate contact handgrips
12. Seat Rotation Handle

**Optional Stabilization Kit (Installed by customer):**

13. Foot Straps
14. Trunk Belt
15. Arm Rests
16. EZ-Grip™ Handgrips (removable)

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The Biodex BioStep is easy to adjust for user comfort. The seat can be moved forward or back and the arms adjust, too. The following section explains how to adjust your BioStep for optimum user comfort and positioning.

**Seat Front-to-Back Adjustment:** The seat can be moved forward or back over a range of 15" to match user comfort requirements. Proper seat front-to-back positioning will allow the user to exercise comfortably. Proper seat positioning allows the leg to extend just short of full extension, provided the patient has no range of motion limitations. In others words, the user should not lock the knee.

**To adjust the seat front-to-back position:**

- Pull up on the Seat Front-to-Back Release Handle. While holding the handle up, slide the seat either forward or back to the desired position. To lock the seat in position, release the handle and make sure it engages in the appropriate hole. To ensure reproducible positioning, note the seat position as per the Seat Front-to-Back Position Scale, located on the seat slide track.

**Rotating Seat:** To aid the user in getting on and off the BioStep, the rotational seat can be turned left or right.

**To rotate the seat:**

- Lift on the Seat Rotation Handle, located under the rear of the seat, to release the seat. You may now swivel the seat left or right until it engages in either position.
- With the seat locked in the desired position, instruct the user to sit down. Pull up on the Seat Rotation Handle and rotate the seat until it engages in the forward locked position.

**Adjustable Arms:** Make this a total body cross-trainer.

**To adjust the arm handles:**

- Loosen the arm handle locking knobs, slide the arms out to the desired length, then tighten the arm handle locking knobs to secure.

**Leveling Guides:** Located underneath the front hood of the unit, the leveling guides can be used to adjust the BioStep to sit level on the floor - even if the floor is slightly uneven. To adjust, use a 9/16" open-end wrench to raise or lower each guide as appropriate. The BioStep must be level and stable before being used.

**Battery Recharge Jack/AC Adapter (Refer to Figure 1, Insert):** The Battery Recharge Jack/AC Adapter is used to recharge the BioStep and BioStep Clinical Pro batteries, or for use at work rates below 30 WATTS and 50 RPMs.

*NOTE: It is recommended that you plug in the adapter overnight to keep the BioStep battery charged to full capacity.*

The Battery Recharge Jack/AC Adapter must be installed correctly before using, as follows. The AC adapter is supplied.

1. Plug the AC adapter cord into the BioStep Battery Recharge Jack/AC Adapter, located at the rear base of the BioStep. Slip the cord under the cord holder directly to the right of the jack.
2. Plug the AC adapter into a wall socket to charge the BioStep battery or to use the BioStep at work rates below 30 WATTS and 50 RPMs.



## 4. QUICK-START OPERATION

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Although the BioStep offers advanced programming capability, it also features a “Quick-Start” function that allows the user to immediately begin exercise with factory preset default values serving for the programmable system parameters.

Quick-Start operation is simple. Seat the user, adjust the seat forward and back position and foot pedal straps as necessary, and proceed as described below:

1. Press <Power On> to power-up. After a brief self-test (which includes display of the current software version,) the system beeps to signify that it is ready to begin collecting data.
2. Grasp the BioStep adjustable arms and begin to exercise.
3. Use the <+> and <-> adjust effort level buttons to adjust resistance level.

*NOTE: The Effort Levels are not wattage settings. They are a series of torque settings with no given value.*

4. To stop the system at any time, simply stop exercising. All parameters will continue to display for one minute before the system shuts off. If you want to turn the system off and automatically reset the display, press <Power ON > again.

*NOTE: The BioStep provides Constant Resistance Control exercise mode. The BioStep Clinical Pro also offers Constant Resistance Control exercise mode, but defaults to Isokinetic Mode. A green LED on the display activates to show the selected mode on the Clinical Pro. To change modes, on the BioStep Clinical Pro, press <Select Exercise> (#4 on display).*

*NOTE: To provide heart rate monitoring, the subject must hold onto both heart rate contact handgrips or use the telemetry chest strap.*

*NOTE: For the first 24 hours of operation, the BioStep should be used with the AC Adapter.*

## 5. BASIC OPERATION

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Figure 2. The BioStep Clinical Pro Display Panel.



Figure 3. The BioStep Display Panel.

(Refer to Figures 2 and 3.)

Quick-Start mode is perfect for acquainting subjects with the BioStep. It gets the user up and exercising in about five seconds. More experienced users, however, will likely prefer the ability to personalize their exercise or rehabilitation routine as described below.

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With the system turned ON, seat the user, adjust the seat forward and back position and foot pedal straps as necessary, and proceed as follows:

*NOTE: Steps one through five, below, correspond to the numbered keys on the display.*

1. Set The Patient Weight: Press <Set Weight> and then use the <+> or <-> arrow keys to adjust the value to the desired setting (for more accurate metabolic calculation).
2. Set the Exercise Duration Time: Press <Set Time> and then use the <+> or <-> arrow keys to adjust the value to the desired setting.

*NOTE: Time counts down if you set the exercise duration. Time counts up if you do not set this value.*

3. Select the Desired Profile: By pressing <Select Profile>, you can scroll through the available profiles. When you see the profile desired, proceed to step 4.
4. Select the Exercise Mode (BioStep Clinical Pro only): Press <Select Exercise> to toggle between Isokinetic (strength exercise / speed control) and Aerobic Exercise (constant / Resistance control).
5. Adjust Isokinetic Speed or Constant Resistance Effort Level: Use the <+> or <-> arrows to adjust the Isokinetic Speed or Constant Resistance level to the desired level.

*NOTE: To make changes to programmed parameters, press <Clear Settings>. This will set all parameters back to default values. You can then begin again at step one, above.*

*NOTE: The Resistance Effort Levels are not wattage settings. They are a series of 30 torque settings with no given value.*

6. Grasp the BioStep adjustable arms and begin to exercise.

*NOTE: The BioStep begins collecting data as soon as the subject begins to step. Once data collection begins, the system scrolls through the settings at the top left side of the display panel. To lock on to a specific setting, i.e., calories, press <Select Display> until you advance to the setting you wish to be displayed. To return to a scrolling display format, press and hold <Select Display> for two full seconds.*

*The BioStep displays Time, Steps, WATTS, Calories, METS and Heart Rate. Work rate is displayed in RPM (Revolutions Per Minute). The BioStep Clinical Pro displays Time, RPMs, WATTS, Calories, METS and Heart Rate. Work rate is displayed in WATTS.*

*NOTE: The BioStep provides Constant Resistance Control exercise mode. The BioStep Clinical Pro also offers Constant Resistance Control exercise mode, but defaults to Isokinetic Mode. A green LED on the display activates to show the selected mode on the Clinical Pro. To change modes, press <Select Exercise> (4) at the bottom of the display.*

*NOTE: To provide heart rate monitoring, the subject must hold onto both heart rate contact handgrips or use the telemetry chest strap.*

*NOTE: For the first 24 hours of operation, the BioStep should be used with the AC Adapter.*

## 6. DISPLAY PARAMETERS

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The top window of the display panel offers readouts for common parameters of exercise and training interest. For the Biostep, these parameters include Time, WATTs, Calories, METs and Heart Rate with work rate shown in RPMs. For the BioStep Clinical Pro, display parameters include Time, RPM, WATTs, Calories, METs and Heart Rate with work rate shown in WATTs. As you exercise, the system displays values for each parameter in the display window. A green indicator light denotes the parameter currently being displayed.

A low-battery LED is located at the bottom left of the display. This indicator illuminates if the battery needs to be recharged. To recharge the battery, simply plug the input jack of the recharging pack into the receptacle at the front of the cycle base or exercise at higher work rates and speeds above 50 RPM. Plug the opposite end of the recharging pack into a wall socket. The system will recharge even while turned OFF.

*NOTE: The BioStep has a Time-Out function based on the system clock. If left on without being used for more than 60 seconds, the BioStep automatically turns OFF and all data is lost. For this reason, it is important to check all accumulated data immediately following any exercise session.*

*NOTE: An explanation of METs, and the relationship of calories burned to oxygen consumption and METs, is provided in Chapter 10, Additional Considerations.*

*NOTE: To toggle OFF the “beep” that sounds as parameters scroll during exercise:*

1. While pressing <Power ON/OFF> to power up the BioStep, press and hold down the <▼> and <Select Display> button until “bPr” appears in the top window. (Do not pedal at this point.)
2. Press <-Adjust> twice so that OFF appears in the top window.
3. Press <Select Display> twice so that 150 appears in the top window (you should hear a beep).
4. Press <Power ON/OFF> to turn the power OFF.
5. Press <Power ON/OFF> to turn the power back ON. The beep should now be disabled during exercise mode.

## 7. SELECTING THE RESISTANCE MODE (Clinical Pro Only)

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The BioStep Clinical Pro provides two modes of operation: Constant Resistance Control and Isokinetic Speed Control. Either mode is selected using the <Select Exercise> key. The BioStep Clinical Pro defaults to Constant Resistance Control. Pressing the <Select Exercise> key will let you toggle between the two choices. A LED illuminates next to the current selection. The Constant Resistance Level or Isokinetic Speed selected are displayed in the exercise window at the bottom of the display. Resistance level and WATTS are also displayed in the resistance level display bar.

*NOTE: Although the resistance level display bar shows up to 300 WATTS, the LED display will show up to 600 WATTS.*

*NOTE: Work rates of 30 to 600 WATTS can be achieved without using the AC adapter when above 30 WATTS and 50 RPM. Using the AC adapter will allow users to achieve work rates as low as 50 WATTS at 25 RPM.*

### CONSTANT RESISTANCE CONTROL (AEROBIC EXERCISE)

- Excellent for heart rate and pulmonary rehab
- Popular for general aerobic conditioning

Constant Resistance Control is ideal for cardiovascular and general aerobic exercise. In this mode, subjects can pedal as fast or as slow as they wish. Using Constant Resistance Control, no matter how fast or slow the subject exercises the resistance stays the same.

When Constant Resistance Control is selected, resistance level is displayed in the Resistance Level Display Window and Resistance Level Display Bar. A selection of 30 resistance levels provides a wide range of work-rate choices. Weak, de-conditioned, or post-operative patients, for example, can exercise at work rates as low as 10 WATTS. Stronger subjects ranging up to highly conditioned athletes can demand as much as 600 WATTS.

### ISOKINETIC SPEED CONTROL (STRENGTH EXERCISE)

- Speed is always constant and resistance is accommodating
- Pedal hard, work rate increases. Pedal easy, work rate decreases
- Excellent for strengthening and building endurance
- Popular for sport training and physical rehabilitation

Isokinetic Speed Control provides accommodating resistance throughout the subject's entire stepping range of motion for the duration of the exercise period. Resistance continuously matches resistance, accommodating to variations in the subject's force output due to weakness or pain at specific points in the range of motion, and to fatigue over the course of the cycling period. With a selection of speeds ranging from 50 to 120 deg/sec, Isokinetic Speed Control can be used to maximize strength gains while minimizing the potential for injury. The default Isokinetic speed setting is 60 RPM.

As subjects exercise with Isokinetic Speed Control, they will quickly notice that you can go only so fast. Once the selected speed is reached, increasing resistance results in increased stepping resistance - try as they might, subjects can't exercise any faster. On the other hand, if resistance is lessened, the exercise resistance will decrease. This reflects the basic premise of Isokinetic exercise: fixed speed with totally accommodating, variable resistance.

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Just what is “totally accommodating, variable resistance?” Simply put, this means that at any point in the range of motion (in this case, the stepping revolution) the resistance encountered by the user will exactly match the force exerted. In other words, the harder one pushes on the pedal, the greater the resistance. Maximum speed never changes and there is little or no resistance provided until the preset speed is achieved.

Because the BioStep Clinical Pro provides totally accommodating Isokinetic resistance for each and every stepping revolution, fluctuations in force output are instantaneously accommodated. Since the amount of resistance the musculoskeletal system must overcome can never exceed that which it can produce at any point in the range of motion, the Isokinetic mode ensures extremely safe and comfortable exercise for rehabilitation users.

## 8. SELECTING AND CUSTOMIZING EXERCISE PROFILES

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The BioStep and BioStep Clinical Pro features five pre-programmed exercise protocols. These can be used in conjunction with over 30 resistance levels for Constant Resistance Control or 20 speed settings for Isokinetic Speed Control applications (Clinical Pro only).

Each pre-programmed exercise protocol can be used as is, or can be customized by changing the weight, time, speed or resistance level values. Modifying the <Set Time> value changes the total time and the duration of each interval. Changing the Set Speed or Resistance Level increases or decreases each interval. The minimum time for each profile is six minutes.

During the exercise, actual patient Resistance in WATTS is displayed on the Resistance Level Bar Graph. The selected program resistance level or speed is displayed in the Exercise Window.

The Resistance Level Bar Graph provides both clinician and user with immediate, real-time biofeedback, which helps make it easy for the user to stay within personal protocol guidelines and for the clinician to be aware of the user's level of resistance.

*NOTE: Resistance may be changed while exercising. If changed, the new resistance becomes the basis for subsequent levels.*

The following sections define each exercise protocol and its potential applications.

*NOTE: For all profiles of less than 10 minutes duration, the warm-up is one minute and the cool down is two minutes. For profiles greater than 10 minutes duration, the warm-up and cool down are two minutes each.*

### CONSTANT RESISTANCE PROFILE EXAMPLES

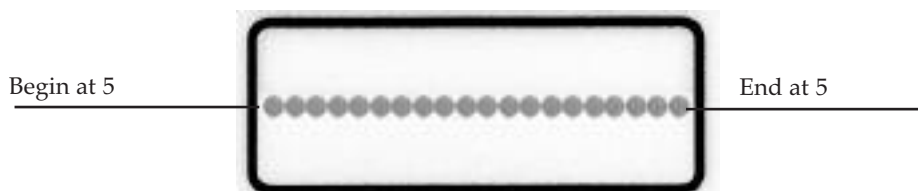
All segments of the Constant Profiles are based on the work rate entered for the peak resistance level work rate when you set Adjust Resistance Level. For example, if you enter "5" as the Peak Resistance Level, the Constant Resistance (Manual Mode) profile will remain at "5" for the duration of the exercise session.

Minimum time for all profiles = 6 minutes.

#### Examples

With a Peak Resistance Level of "5", a Constant Resistance (Manual Mode) Profile will appear like the following example:

Peak Resistance Level: 5



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With a Peak Effort Level of "20" (200 WATTS), a Constant Power Aerobic Interval Training Profile will appear like the following example. (Refer to next page for profile definition):

Peak Effort Level: 20 (200 WATTS)

Warm Up at level 9 (20 x 45%)

Initial Low = 13 (20 x 65%)

First High = 20 (peak resistance)

Second Low = 13 (20 x 65%)

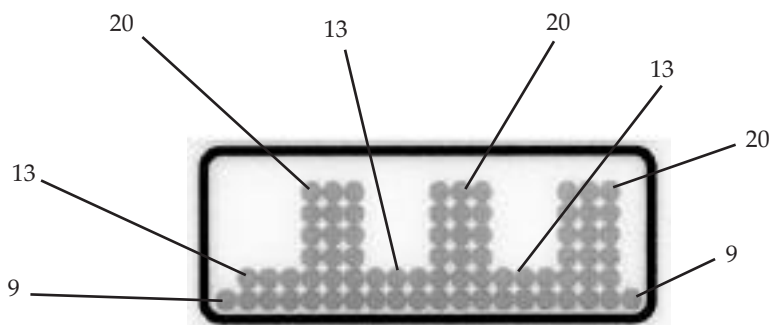
Second High = 20 (peak resistance)

Third Low = 13 (20 x 65%)

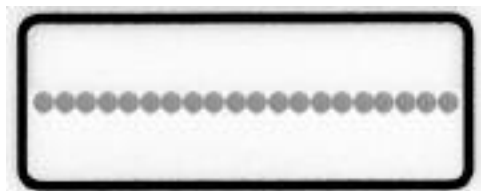
Third High = 20 (peak resistance)

Cool Down = 9 (20 x 45%)

\*All values for Constant Power are rounded to the nearest unit of 10.



### Constant Resistance (Manual Mode)



Resistance level is consistent for the duration of this profile. The user selects the peak resistance level and simply begins to pedal.

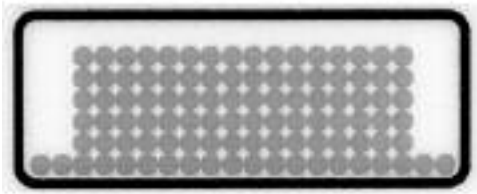
- Appropriate for general aerobic endurance
- Exercise at lower work rates for longer period of time if de-conditioned or weight loss is the goal
- Minimum setting: 1



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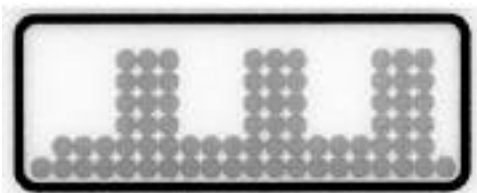
### Constant Resistance Level with Warm-Up and Cool Down



The starting segment (1, warm-up) and ending segment (3, cool down) are set at 25% of selected peak resistance level or the minimum resistance for the first three segments produced in the resistance bar, whichever is greater. The middle segment (2, work) is set at the peak resistance level selected by the user.

- Includes a warm-up and cool down period
- Appropriate for general aerobic endurance
- Exercise at lower work rates for longer period of time if de-conditioned or weight loss is the goal
- Minimum peak effort level: 2
- Minimum initial warm-up: 1

### Aerobic Interval Training



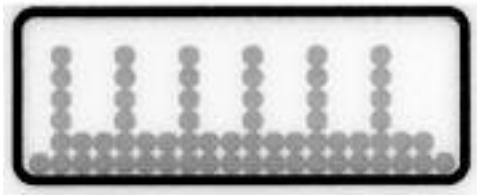
The starting segment (1, warm-up) and ending segment (8, cool down) are set at 45% of selected peak resistance level or the minimum resistance for the first three segments produced in the resistance bar, whichever is greater (1,8). Low level segments, (2,4,6) are set at 65% of selected peak resistance. High level segments, (3,5,7) are the selected peak resistance level.

- Warm-up followed by three intervals of high resistance, then low resistance
- Low intervals are 65% of high resistance level
- For improving aerobic capability or if extremity circulation problems are experienced
- Exercise at upper end of target zone to a moderate level of fatigue at each interval
- Minimum peak effort level: 5

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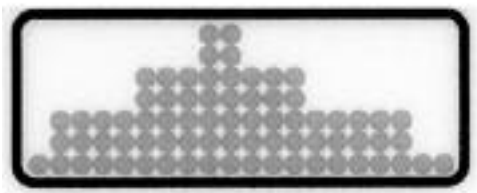
## Anaerobic Interval Training



The starting segment (1, warm-up) and ending segment (14, cool down) are set at 45% of selected peak resistance level or the minimum resistance for the first three segments produced in the resistance bar, whichever is greater. Low level segments, (3,5,7,9,11,13) are set at 65% of selected peak resistance. High level segments, (2,4,6,8,10,12) are the selected peak resistance level.

- Warm-up followed by six short intervals of high-level resistance
- Low intervals are 65% of high resistance
- For improving strength and endurance – mimics sport conditions of short, intense resistance followed by longer recovery periods
- Minimum peak effort level: 5

## Pyramid



The starting segment (1, warm-up) and ending segment (7, cool down) are set at 45% of selected peak resistance level or the minimum resistance for the first three segments produced in the resistance bar, whichever is greater. Segments 2 and 6 are set at 75% of selected peak resistance level while segments three and five are set at 85% of selected peak resistance level.

- Warm-up followed by three increasingly difficult intervals, then two less difficult intervals
- Peak resistance is the set resistance
- Less difficult intervals are 85% and 75% of peak resistance
- Use for general conditioning of both aerobic and anaerobic systems
- Minimum peak effort level: 5

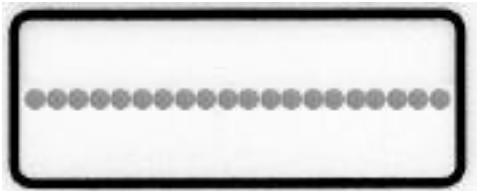
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### ISOKINETIC PROFILES DEFINED (Clinical Pro Only)

Minimum time is six minutes for all profiles, target resistance level LED will flash during time duration for that segment. All segments following warm up are based on the actual work rate performed in the immediate previous segment.

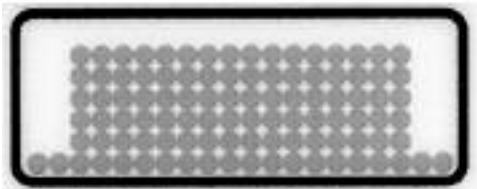
#### Constant Resistance (Manual Mode)



Speed is consistent for the duration of this profile. The user selects the speed and simply begins to pedal. Resistance level is how hard the patient pushes against the pedal.

- Appropriate for general aerobic endurance
- Exercise at lower work rates for longer period of time if de-conditioned or weight loss is the goal

#### Constant Level with Warm up and Cool Down



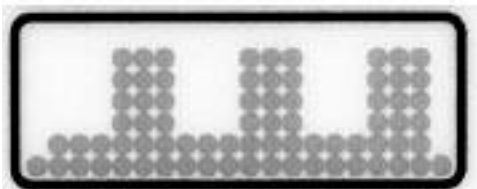
The starting segment (1, warm-up) is however hard the patient chooses to work. The middle segment (2, work) target value equals 100% more than the average actual work rate performed in the warm-up segment (rounded to the nearest 10 WATTs). Target resistance level flashes in the resistance bar during the time duration for the work segment. The cool down segment equals 50% less than work performed in the work segment.

- Includes a warm-up and cool down period
- Appropriate for general aerobic endurance
- Exercise at lower work rates for longer period of time if de-conditioned or weight loss is the goal

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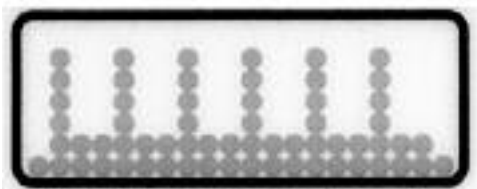
## Aerobic Interval Training



1. The starting segment (1, warm-up) is however hard the patient chooses to work.
2. Initial Low level equals 25% more than the average actual work rate performed in the warm-up segment.
3. First High level equals 100% more than the average actual work rate performed in the initial low level.
4. Second Low level: Equals 50% less than the average actual work rate performed in the First High Level work segment.
5. Second High Level work segment equals 100% more than the average actual work rate performed in the Second Low Level.
6. Third Low equals 50% less than the average actual work rate performed in the Second High Level work segment.
7. Third High Level equals 100% more than the average actual work rate performed in the Third Low level.
8. Cool Down equals 25% less than the average actual work rate performed in the Third Low level.

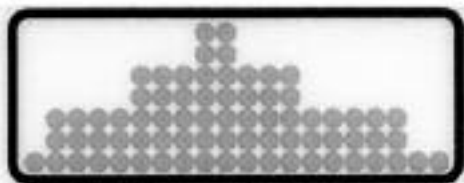
- Warm-up followed by three intervals of high resistance, then low resistance
- For improving aerobic capability or if extremity circulation problems are experienced
- Exercise at upper end of target zone to a moderate level of fatigue at each interval

## Anaerobic Interval Training



1. The starting segment (1, warm-up) is however hard the patient chooses to work.
2. First High level equals 300% more than the average actual work rate performed in the initial segment.
3. First Low level equals 75% less than the average actual work rate performed at the First High Level.
4. Second High Level equals 300% more than the average actual work rate performed in the First Low Level.
5. Second Low Level equals 75% less than the average actual work rate performed at the Second High Level.

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6. Third High Level equals 300% more than the average actually work rate performed in the Second Low level.
  7. Third Low Level equals 75% less than the average actual work rate performed at the Third High Level.
  8. Fourth High Level equals 300% more than the average actually work rate performed in the Third Low level.
  9. Fourth Low Level equals 75% less than the average actual work rate performed at the Fourth High Level.
  10. Fifth High Level equals 300% more than the average actually work rate performed in the Fourth Low level.
  11. Fifth Low Level equals 75% less than the average actual work rate performed at the Fifth High Level.
  12. Sixth High Level equals 300% more than the average actual work rate performed in the Fifth Low level.
  13. Sixth Low Level equals 75% less than the average actual work rate performed at the Sixth High Level.
  14. Cool down equals 25% less than the average work rate performed in the Sixth Low Level.
- Warm-up followed by six short intervals of high-level resistance
  - Low intervals are 25% of high resistance. High resistance needs to be greater than 40 WATTS for the target LED to flash in low level.
  - For improving strength and endurance – mimics sport conditions of short, intense resistance followed by longer recovery periods



1. The starting segment (1, warm-up) is however hard the patient chooses to work.
  2. First Level equals 65% more than the average actual work rate performed in the initial warm up segment.
  3. Second Level equals 20% more than the average actual work rate performed in the First Level.
  4. Peak level equals 15% more than the average actual work rate performed in the Second Level.
  5. First Level Descending equals 15% less than the average work performed at the Peak Level.
  6. Second Level Descending equals 35% less than the average work performed at the Peak.
  7. Cool Down equals 25% less than the average work performed in the Second Descending Level.
- Warm-up followed by three increasingly difficult intervals, then two less difficult intervals
  - Peak resistance is the set resistance
  - Less difficult intervals are 85% and 65% of peak resistance
  - Use for general conditioning of both aerobic and anaerobic systems

# 9. HEART RATE MONITORING

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## HEART RATE MONITORING

The BioStep's Heart Rate Monitoring feature allows clinicians to monitor user heart rate during exercise sessions. This can be done using the heart rate contact handgrips, or by attaching the wireless Polar heart rate monitor belt directly to the patient.

### *Heart Rate Contact Handgrips*

To use the heart rate contact handgrips for heart rate monitoring, the patient needs only to grasp both BioStep heart rate contact handgrips while exercising. The heart rate will be displayed in real-time value in the upper display window. When the heart rate is being displayed, the heart rate LED will be illuminated.

### *Wireless Heart Rate Chest Strap*

The wireless Heart Rate Chest Strap is attached directly to the patient. When used, it sends heart rate related information directly to the display panel.

To attach the Heart Rate Chest Strap directly to the patient:

1. Have the patient lift shirt and secure the Heart Rate Chest Strap around the chest so that it is in direct contact with the skin just below the breast. (The strap should be dampened with a conducting gel, sponge or wet cloth to ensure maximum conductivity.)
2. Position the patient on the BioStep and check that the heart rate information is being provided in the top window of the display panel.

## HEART RATE CHART

As illustrated by the following chart, medical authorities have determined target heart rate ranges for optimum cardiovascular benefit. While the chart may be used as a guide or starting point, concessions must be made based on individual user needs.



**CAUTION:** As a general guideline, use the following equation in estimating Maximum Heart Rate for a heart rate healthy user:

$$\text{Maximum Heart Rate} = 220 - \text{user age in years}$$

*Example: A heart rate healthy 30 year-old would use a Max. H/R of 190 beats per minute.*



**ATTENTION:** On ne do it jamais se servir de la pulsation cardiaque qui se rapproche de la limite maximum de sécurité de la personne. Servez-vous de l'équation suivante comme guide pour estimer la pulsation cardiaque maximum sécuritaire pour une personne en santé.

$$\text{Pulsation cardiaque maximum} = 220 - \text{l'âge de la personne}$$


*Example: Une personne de 30 ans en santé et sans problème cardiaque devrait s'en tenir à une pulsation cardiaque maximum de 190 par minute.*


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**NOTE:** If the heart rate is not displayed, or appears to be incorrect, adjust the Heart Rate Chest Strap for improved conductivity, or have the patient reposition both hands on the heart rate handle bar. (You may want to take the user's pulse rate manually and compare it against the displayed heart rate to confirm accuracy. Elderly patients may need to use hand cream or water to improve signal strength.)

The following chart depicts standard Target Heart Rate ranges for optimum cardiovascular benefit. While this chart may be used as a guide for heart rate-healthy users, clinicians must be sure to set the Target Heart Rate based on individual patient protocol.

 **CAUTION:** When prescribed for therapeutic purposes, a physician should clearly define the parameters of use (i.e., total work, maximum heart rate, etc.) to reduce the risk of patient injury.

 **ATTENTION:** Quand l'appareil est utilisé en thérapie, le médecin responsable doit définir les paramètres spécifiques en patient pour limiter tout risque et notamment le travail total et la fréquence cardiaque.

Age	Estimated Maximal Attainable Heart Rate	85% Level	70% Level
20	200	170	140
25	195	166	136
30	190	162	133
35	185	157	129
40	180	153	126
45	175	149	122
50	170	145	119
55	165	140	115
60	160	136	112
65	155	132	108

## 10. ADDITIONAL CONSIDERATIONS

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**CAUTION:** *As with any other piece of user-interactive exercise equipment, certain considerations must be ensured before anyone is allowed to exercise on the Biodex BioStep. Following is a brief summary of some points to consider.*

- 1. All users should have medical clearance prior to undertaking any rigorous exercise program. This is especially necessary for any user with a past history of heart rate problems or known risk factors including: family history of cardiovascular disease, elevated blood pressure, hyperlipidemia, diabetes, obesity, sedentary lifestyle and smoking.*
- 2. Start each user at a safe exercise level. Do not allow users to overexert themselves on the BioStep. Symptoms of overexertion may include, but are not limited to: pain or discomfort, shortness of breath or difficulty in breathing.*
- 3. Prior to starting any exercise session, ensure that the user is comfortably seated. Be sure to adjust the seat front-to-back and adjustment arm length as necessary. Mechanical adjustments are described in detail in the Mechanical Adjustments section of this manual.*
- 4. Warm-up and warm-down periods are necessary to avoid suddenly taxing the heart and circulation system, and to help prevent injury to the muscles or joints. Sufficient warm-up and warm-down periods have also been shown to reduce muscle soreness following exercise. Be sure to allow for a minimum of three to five minutes of gradually increasing exercise intensity prior to starting the actual exercise session and a similar amount of time of decreasing exercise intensity following each session.*

### WHAT IS A MET?

The acronym MET stands for "metabolic equivalents"

METs are a unit of measurement that estimate the amount of physical demand placed on a person's cardiopulmonary system. METs are often used in prescribing exercise for patients involved in cardiopulmonary rehabilitation.

The MET level at which one exercises, is directly proportional to the amount of oxygen being consumed, the amount of power (WATTS) accomplished, and the amount of calories burned while exercising.

1 MET is equal to the amount of oxygen the body consumes at rest (lying down). The amount of oxygen one consumes at rest is estimated to be approximately 3.5 ml of oxygen for each kilogram of body weight every minute or 3.5 ml/kg/min.

Each increase in energy expenditure of 3.5 ml/kg/min. is increasing one's energy expenditure by 1 MET.

MET charts have been developed by researchers to estimate the MET levels of domestic and recreational activities. These estimations are generalizations as to how many times an individual needs to elevate their metabolic rate (METs) to accomplish such activities.

The American College of Sports Medicine has published formulas to estimate the oxygen cost of exercising at various work loads on treadmills, lower body cycles, upper body cycles, stepping, and outdoor walking and running. MET levels can be determined by simply dividing oxygen consumption in ml/kg/min. by 3.5.



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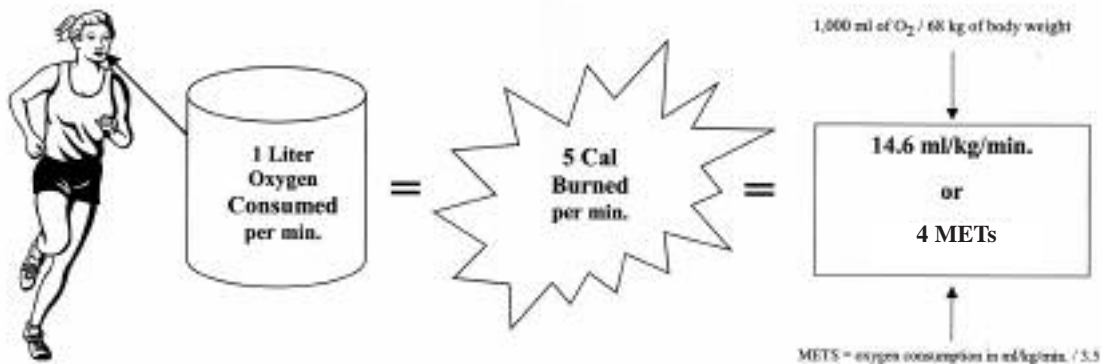
## BIODEX ERGOMETERS SUPPORT METs AND AID EXERCISE PRESCRIPTION FOR BOTH CARDIOPULMONARY AND MEDICAL FITNESS

A cardiac stress test typically reports the max MET level achieved by the patient and/or the MET level achieved at the point the test turned positive (often demonstrating ischemic changes in the heart muscle and/or inappropriate arrhythmias). Cardiologists often ask therapists to keep a patient below a certain MET level based on this information from the cardiac stress test. The Cardiologist will report, for example, “ischemic changes at 10 METs/Heart Rate 128. Exercise at or below 9 METs”.

Different types of cardiovascular exercise machines require the user to work at different work loads (WATTS) to ensure a consistent elevation of an individual’s metabolic rate and the corresponding appropriate heart rate. Cranking an upper body cycle at 100 WATTS will, for example, have a very different effect on one’s metabolic rate and heart rate when compared to stepping a lower body cycle at 100 WATTS. It is up to the clinician to set the appropriate workloads on each ergometer, or speed and elevation on the treadmill, to achieve the appropriate MET level.

### THE RELATIONSHIP OF CALORIES BURNED TO OXYGEN CONSUMPTION AND METs

For every liter of oxygen consumed by the body during exercise, the body burns approximately 5 calories. The example below shows a 150 lb (68 kg) individual exercising at a level requiring an oxygen consumption of 1 liter (1,000 ml) of oxygen each min., which would require that they burn 5 calories each min. to supply the appropriate amount of energy for the exercise. This same individual would be burning 14.6 milliliters of oxygen for each kilogram of body weight per min. (1,000 ml of oxygen / 68 kg of body weight). Since one MET = (oxygen consumption in ml/kg/min.) / (3.5), this individual would be exercising at 4 METs. They would need to elevate their resting metabolism approximately 4 times to achieve this sustain this rate of exercise.



**NOTE:** In a study designed to examine the test-retest reliability and concurrent criterion validity of  $VO_{2max}$  on the BioStep in community-dwelling older adults, results provided preliminary evidence of reliable and valid estimates of oxygen consumption by the BioStep when compared with the criterion standard of direct  $VO_{2max}$  measurement in the sample.

Reference: Mendelsohn, M.E., Connelly, D.M., Overend, J.J., Petrella, R.J.:Reliability and validity of responses to submaximal all-extremity semi-recumbent exercise in older adults. *Journal of Aging and Physical Activity*, 2007, 15, 184-194.



NOTA – Comme pour tout autre équipement d'exercice interactif avec l'utilisateur, on doit s'assurer du respect de certaines considérations avant de permettre à quiconque de s'exercer sur l'appareil BioStep de Biodex. Voici un bref aperçu de certains points dont il faut tenir compte.

1. Tous les utilisateurs doivent recevoir une permission médicale avant d'entreprendre tout programme d'exercices rigoureux. Cela est particulièrement nécessaire dans le cas de tout utilisateur ayant un historique de difficultés du rythme cardiaque ou de facteurs de risques connus, y compris : un historique familial de maladie cardio-vasculaire, l'hypertension artérielle, l'hyperlipidémie, le diabète, l'obésité, un mode de vie sédentaire et le tabagisme.
2. Au début, faire évoluer chaque utilisateur à un niveau sécuritaire d'exercice. Ne pas permettre aux utilisateurs de se surmener sur l'appareil BioStep. Les symptômes du surmenage peuvent comprendre, sans s'y limiter : la douleur ou le malaise, la respiration courte ou la difficulté à respirer.
3. Au début de toute séance d'exercice, s'assurer que l'utilisateur est assis confortablement. Veiller à régler la position d'avance et de recul du siège, ainsi que la longueur du bras de réglage, selon le besoin. On trouvera la description détaillée des réglages mécaniques au chapitre Réglages mécaniques du présent manuel.
4. Des périodes d'échauffement et de récupération sont nécessaires pour éviter de surcharger subitement le cœur et le système circulatoire et pour aider à prévenir les lésions aux muscles et aux articulations. Il a été démontré que des périodes suffisantes d'échauffement et de récupération réduisent les douleurs musculaires après l'exercice. Veiller à prévoir au minimum entre trois et cinq minutes d'exercices dont l'intensité augmente graduellement avant le début de la séance d'exercice proprement dite, ainsi qu'une période semblable d'exercices dont l'intensité va en diminuant après chaque séance.

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## QU'EST-CE QU'UN MET?

L'acronyme MET signifie « équivalent métabolique ».

Le MET sert d'unité de mesure pour estimer l'Resistance demandé au système cardiopulmonaire d'une personne. On utilise souvent les MET pour prescrire des exercices à des patients en cours de réadaptation cardiopulmonaire.

Le taux métabolique (en MET) auquel on effectue un exercice est directement proportionnel à la quantité d'oxygène consommée, à la puissance développée (en WATTS) et aux calories brûlées durant l'exercice.

Le MET correspond à la quantité d'oxygène que l'organisme consomme au repos (sujet couché). On estime cette quantité à environ 3,5 millilitres d'oxygène par kilogramme de poids corporel par minute, soit 3,5 ml/kg/min.

Chaque augmentation de 3,5 ml/kg/min de la dépense énergétique augmente la vitesse de métabolisme de 1 MET.

Les chercheurs ont mis au point des tableaux où ils estiment le nombre de MET pour des activités domestiques et récréatives. Ces estimations sont des généralisations sur le nombre de fois qu'une personne doit augmenter son taux métabolique (le nombre de MET qu'elle doit développer) pour effectuer ces activités.

L'American College of Sports Medicine publie des formules permettant de faire l'estimation de la dépense en oxygène de l'exercice, sous diverses charges de travail, sur tapis roulant, sur cycles pour membres inférieurs et pour membres supérieurs, de la montée-descente sur escabeau, ainsi que de la marche et de la course à l'extérieur. On calcule le taux métabolique en MET en divisant simplement la consommation d'oxygène (en ml/kg/min) par 3,5.

## LES ERGOMÈTRES BIODÉX FACILITENT LE CALCUL DES MET ET LES PRESCRIPTIONS D'EXERCICE POUR CARDIOPULMONAIRE ET MISE EN FORME SOUS SURVEILLANCE MÉDICALE.

L'épreuve d'Resistance cardiaque indique normalement le nombre maximal de MET atteint par le patient, ou le nombre de MET au point où l'épreuve passe au positif (souvent avec manifestation de changements ischémiques dans le muscle cardiaque ou d'arythmies inappropriées). Les cardiologues demandent souvent aux thérapeutes de maintenir le patient au-dessous d'un certain nombre de MET sur la foi de cette information, glanée de l'épreuve d'Resistance cardiaque. Dans son rapport, le cardiologue fait état, par exemple de « modifications ischémiques à 10 MET/fréquence cardiaque 128. Exercice à vitesse de métabolisme égale ou inférieure à 9 MET. »

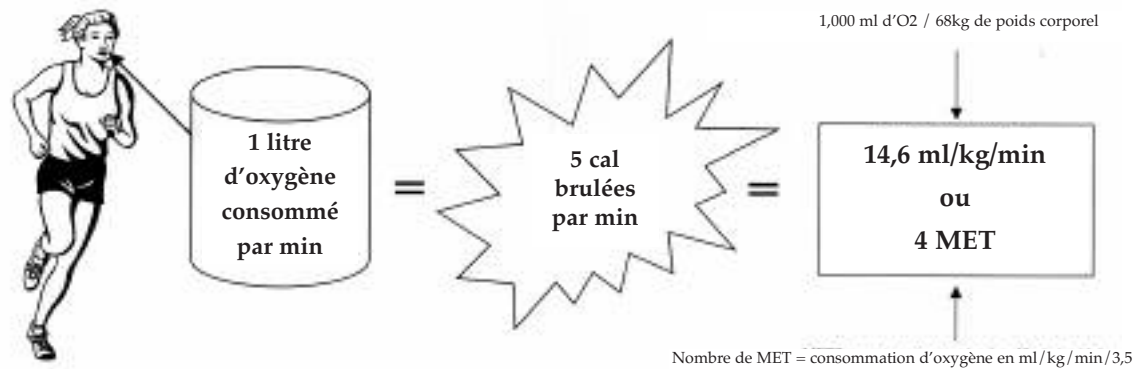
Les différents types de machines d'exercice cardiovasculaire demandent à l'utilisateur des charges de travail (en WATTS) différentes pour assurer une augmentation uniforme de la vitesse de son métabolisme, ainsi que la fréquence cardiaque correspondante appropriée. Activer les manivelles d'un cycle pour membres supérieurs à 100 WATTS, ou pédaler un cycle pour membres inférieurs à 100 WATTS, sont des activités qui ont de effets très différents sur la vitesse de métabolisme et la fréquence cardiaque du sujet. C'est au clinicien qu'il revient de fixer les charges de travail qui conviennent sur chaque ergomètre, ou la vitesse et l'élévation du tapis roulant, afin d'atteindre le taux métabolique en MET approprié.

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## RAPPORT ENTRE CALORIES BRÛLÉES, CONSOMMATION D'OXYGÈNE ET MET

Pour chaque litre d'oxygène consommé par l'organisme durant l'exercice, ce dernier brûle environ 5 calories. L'exemple ci-dessous illustre une personne de 68 kg (150 lb) s'exerçant à un niveau qui demande une consommation de 1 litre (1 000 ml) d'oxygène chaque minute. Pour ce faire, elle doit brûler 5 calories chaque minutes afin de fournir la quantité d'énergie appropriée à l'exercice. Cette même personne brûle 14,6 millilitres d'oxygène pour chaque kilogramme de son poids corporel par minute (1 000 ml d'oxygène / 68 kg de poids corporel). Étant donné que un MET = (consommation d'oxygène en ml/kg/min) / (3,5), cette personne s'exerce à un taux de 4 MET. Elle doit augmenter son métabolisme au repos environ 4 fois pour atteindre et maintenir ce taux d'exercice.



# 11. MAINTENANCE & CLEANING

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The BioStep has been designed to provide many years of dependable use. To help ensure this product performs to the maximum specifications, and to increase the life of the product, please note the following general cleaning instructions and maintenance procedures.

1. As required, clean all exterior surfaces, upholstery and restraining straps. Specialized vinyl cleaners or protectants are recommended for upholstery and cushions. Otherwise, use a solution of warm water and mild detergent.
2. As needed, wipe the display using a soft rag dampened with alcohol.
3. Lubricate the linkage bearings with lithium grease or oil as needed. Periodic lubrication of the bearings will prevent them from becoming noisy. Lubricate the linkage bearings once a year or every six months for heavy usage.

## SUGGESTED METHODS FOR LUBRICATING LINKAGE BEARINGS

1. With the BioStep resting on its side, apply oil or grease to the outer race of the spherical bearings. Allow the BioStep to set for several minutes while the oil wicks to the opposite side. Lay the BioStep on the opposite side and repeat. Return the BioStep to its upright position.
2. Axially rotate the linkage in question to expose the maximum amount of ball bearings and race. Place the extension tube from the spray can of lithium grease between the linkage components and spray lightly. Repeat this for all 12 spherical bearings. Move the linkages in both directions to ensure the grease wicks to the steel ball of the bearing.
3. Remove the set screws from within the lubrication port located on the ends of the cast links. Insert the extension tube from the spray can of lithium grease into the port. While holding a rag over the grease port to prevent spray back, spray lubrication into the bearings. The set screws do not need to be replaced.

## 12. SPECIFICATIONS

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**Dimensions:** 65" l x 28" w x 47.25" h (165 x 71 x 121 cm)

**Resistance:**

BioStep: Constant resistance with 30 effort levels

BioStep Clinical Pro: Constant resistance and Isokinetic

**Work Rate Range:** 10 watts - 600 watts (25 -120 rpm)

**Heart Rate Monitoring:** Polar® Telemetry (chest strap) and contact handgrip

**Readouts:**

BioStep: Time, RPM, watts, calories, METs, heart rate and total steps

BioStep Clinical Pro: Time, RPM, watts, calories, METs and heart rate

**Communication:** RS-232 port, CSAFE protocol for data export  
(data collection software available)

**User Capacity:** 500 lb (227 kg)

**Weight:** 254 lb (115 kg)

**Power:** Self-Powered; no external power requirement at user work rates over 30 watts and 50 rpms; 115 VAC adapter (230 VAC available) is provided to power system and charge battery during applications below 30 watts and 50 rpms; battery automatically recharges at work rates above 30 watts and 50 rpms. AC Adapter included.

**Certifications:** ETL listed to UL1647 and CAN/CSA C22.2 No.68-92, EN957-1, EN957-5. CE conformity to low voltage and EMC directives

**Warranty:** Two-years parts; one-year labor



950-215 BioStep®, 115 VAC

950-220 BioStep® Clinical Pro, 115 VAC

*FSS Contract# GS-03F-0017T*

*Export models available.*

*Patent Pending*

**Optional**

950-245 Stabilization Package

*Includes: Movable armrests, trunk belt,  
foot straps and EZ-Grip™ handgrips*

950-164 Software, Data Collection

# 13. ELECTROMAGNETIC COMPATIBILITY

<u>Standard</u>	<u>Test Method</u>	<u>Range</u>	<u>Limits</u>	<u>Result</u>		
IEC 61000-3-2	Harmonics	100 Hz to 2KHz	Class A	THD = 251.94%		
IEC 61000-3-3	Flicker	observation time (TP) 10 min max voltage change (dmax) max Rel steady state voltage change (dc) duration of d(t)>3%(t) short term flicker Sev (PST) long term flicker Sev (PLT)	- 4% 3% .2 sec 1.00 .65	- 0.00 % 0.00 % 0.00 sec 0.00 0.00		
IEC 61000-4-2	Electrostatic Discharge	Contact: 4 & 6Kv pos/neg 1pps for 10 sec Air: 2, 4, & 8Kv pos/neg 1pps for 10 sec	no degradation of performance	complied		
IEC 61000-4-3	Radiated Immunity	80 MHz to 1000 MHz / 3v/m Horiz & Vertical @ 2M 1000 MHz to 2500 MHz / 3v/m Horiz & Vertical @ 1M	no degradation of performance	complied		
IEC 61000-4-4	Electrical Fast Transient/ Burst, Power Leads	PWR Input leads .5, 1, & 2 Kv / pos & neg / 5KHz Rep Rate	no degradation of performance	complied		
IEC 61000-4-6	Conducted Immunity, Power Leads	150 KHz to 80 MHz / 3Vrms	no degradation of performance	complied		
IEC 61000-4-8	Magnetic Immunity	3A/M RMS @ 50/60 Hz	no degradation of performance	complied		
IEC 61000-4-11	Voltage Dips and Interrupts	<b>Int Duration</b> Int 20msec Int 100msec Int 500msec Int 5000msec	<b>Pause between</b> pause 10 sec pause 10 sec pause 10 sec pause 10 sec	<b>% reduction</b> >95% 60% 30% >95%	no degradation of performance no degradation of performance no degradation of performance no degradation of performance no degradation of performance	complied complied complied complied complied
CISPR 11	Conducted Emissions	150 KHz - 500 KHz / 5 MHz - 30 MHz, Class A, Group 1	79/73 dbuV QP 66/60 dbuV AV	complied		
CISPR 11	Radiated Emissions	30 MHz - 230 MHz / 230MHz - 1GHz, Class A, Group 1	40/47 dbuVm @ 10 m	complied		
IEC 61000-4-5	Surge Immunity, Power Leads	1 Kv, differential 1ppm, pos/neg	no degradation of performance	complied		

# 14. OPTIONAL

The optional Stabilization Kit (950-245) provides flip-up/flip-down arm rests, a seat belt and buckle, and a pair of foot straps to help stabilize patients on both the BioStep and BioStep Clinical Pro Semi-Recumbent Elliptical. All components of the kit are easy to install.

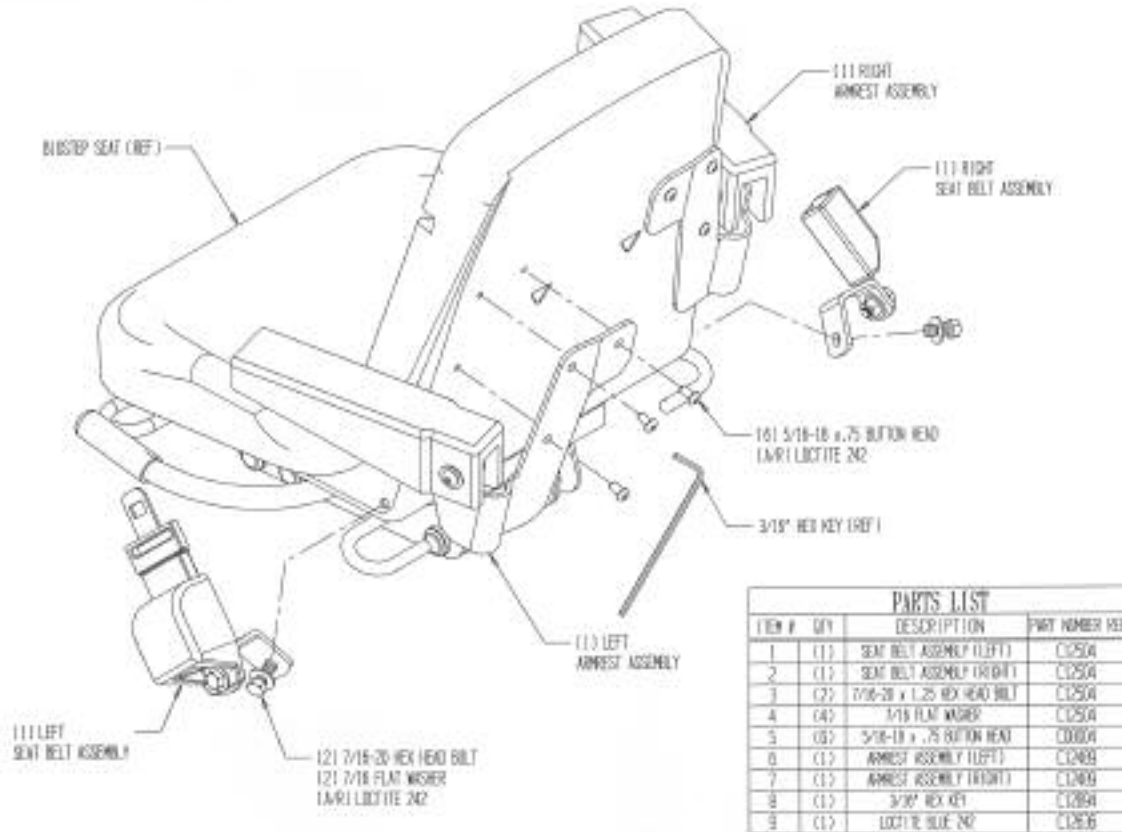


Figure 4: Installing the optional Stabilization Kit.

## INSTALLING THE OPTIONAL ARM RESTS

(Refer to Figure 4.)

### Tools Required:

Allen Key (supplied)

The optional Arm Rests are designed so they can be lifted up and out of the patient’s way when not needed. For each of the two arm rests, simply align the three pre-drilled holes on the back of the folding arm rest support plate with the three pre-drilled holes in the seat back. Use the screws and Allen key supplied to tightly secure each arm rest plate to the seat back.



## **INSTALLING THE OPTIONAL SEAT BELT AND BUCKLE**

*(Refer to Figure 4.)*

### Tools Required:

5/8" Wrench

To install the optional seat belt and buckle, coat one of the two 7/16-20 hex head bolts supplied with Loctite 242. Align the pre-drilled hole in the seat belt assembly with the hole on the patient left side of the seat base and then secure the belt assembly to the seat using the washer and bolt. The buckle assembly is secured in the same manner on the patient right side of the seat.

## **INSTALLING THE OPTIONAL EZ-GRIP HANDGRIPS**

*(Refer to Figure 4.)*

The optional EZ-Grip Handgrips come with a left and a right, they are not interchangeable. When properly installed, the flat side of the grip will face to the inside of the BioStep with the widest part of the handgrip on the bottom and pointing toward the patient.

To install each handgrip, lift up on the plastic tab and pull the two halves in opposite directions to open. Position the handgrip with the wide end at the bottom and pointing toward the patient, then squeeze the two halves toward each other until they lock together.

## **INSTALLING THE OPTIONAL FOOT STRAPS**

To install the optional foot straps, slide the hook side of the strap up through the innermost foot strap slot and fasten the strap to itself. Take the remaining end of the strap and feed it down through the remaining foot strap slot and around the outside of the foot plate before fastening the Velcro to itself.

# 15. DIAGNOSTICS

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There are two hidden key presses that will allow for either configuration, setup or hardware debug.

## Configuration Mode

To enter the configuration setup mode, power the unit ON while holding the select profile button down during power on LED test. Use the +/- adjust buttons to toggle through the selections. The selections for configuration setup are as follows:

<u>ENGL/EURO</u>	<u>Description</u>
1 UBC/ BIO	UBC or BioStep
CPRO or STD HRS	For Clinical Pro BioStep with both Constant Torque and Isokinetic resistance or Standard BioStep with constant torque only.

## Diagnostic Mode

(For 950-214 and 950-220. See NOTE at end of this section for 950-215.)

To enter the debug mode, power the unit ON holding the select exercise button down during power on LED test. Use the select exercise button to cycle through the selections.

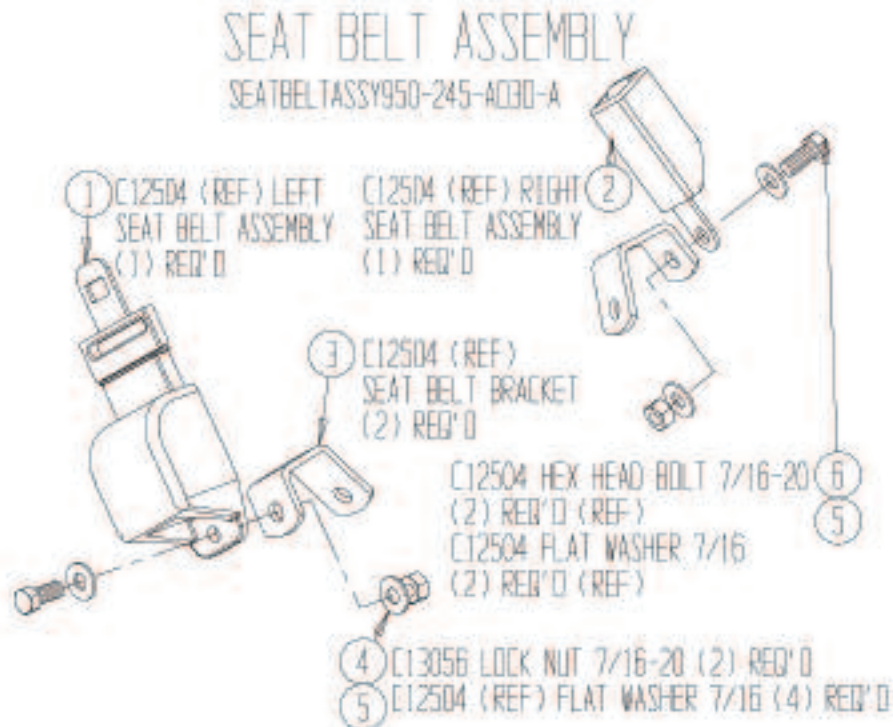
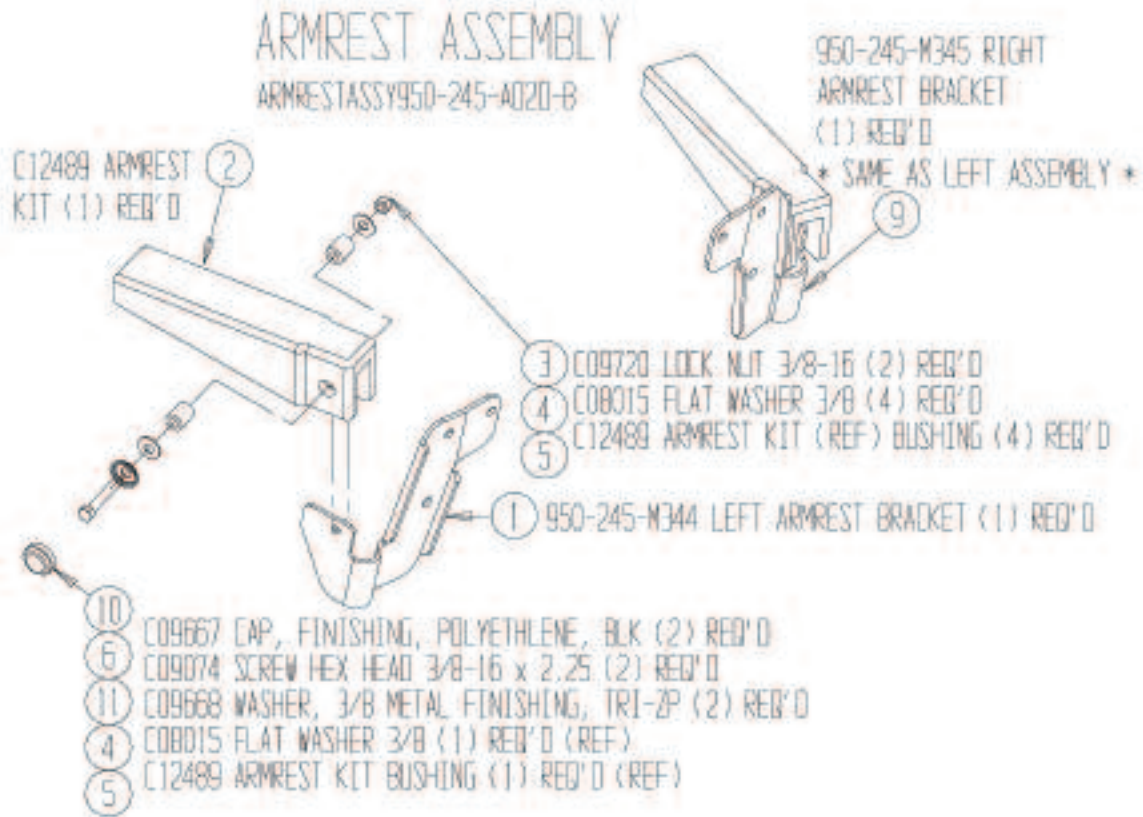
The selections for hardware debug mode are as follows:

Description

1. Load PWM / Speed display Ramps PWM value from 0-255 (0-100%) displayed in upper display window (use <▲> to increase resistance)..
2. Batt Displays battery voltage in lower window

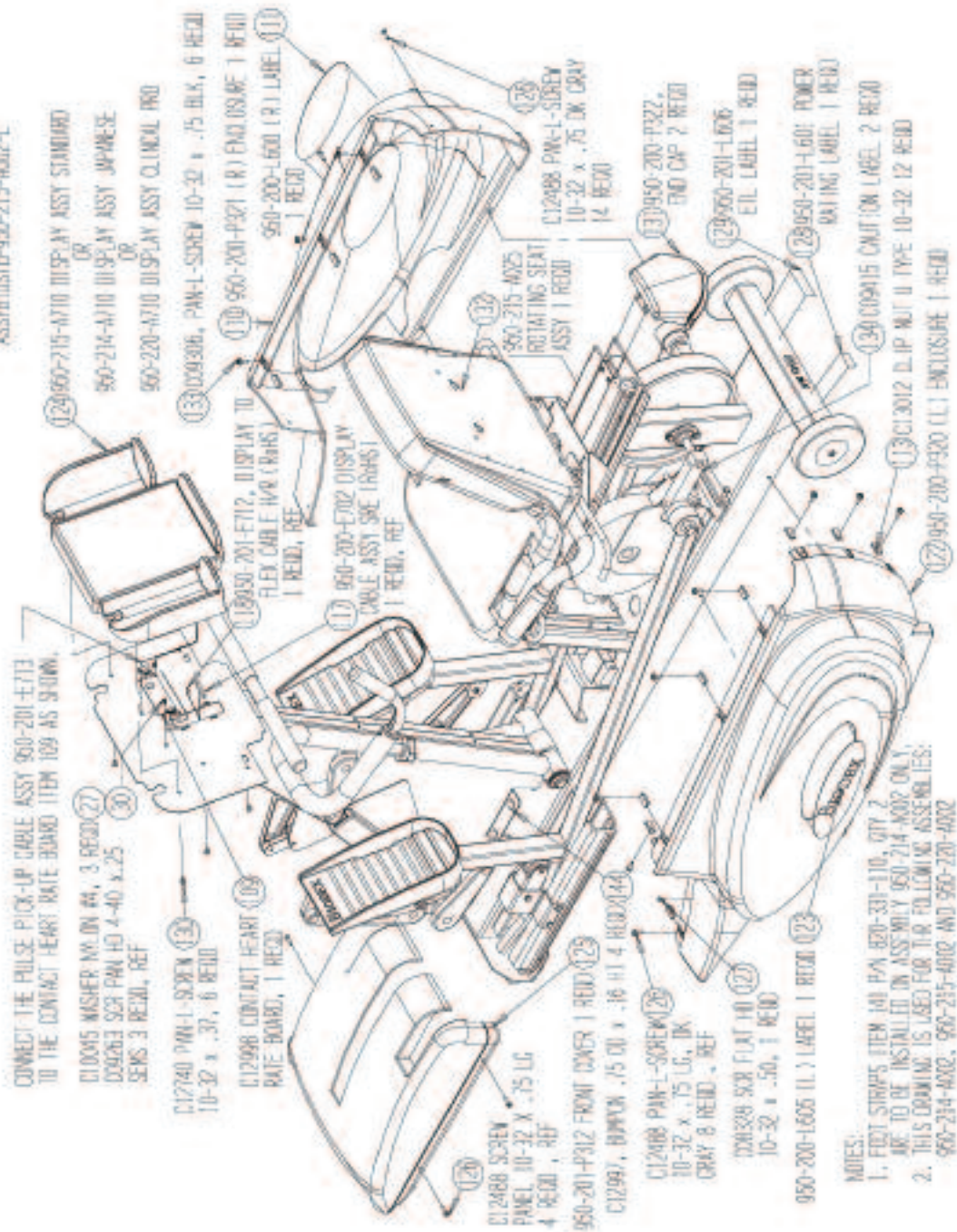
*NOTE: The <Select Exercise> button is hidden but functional on model 950-215. To activate, press down on the display 2-3/4" below the <Select Profile> button while holding down <▼>.*

# 16. REPLACEMENT

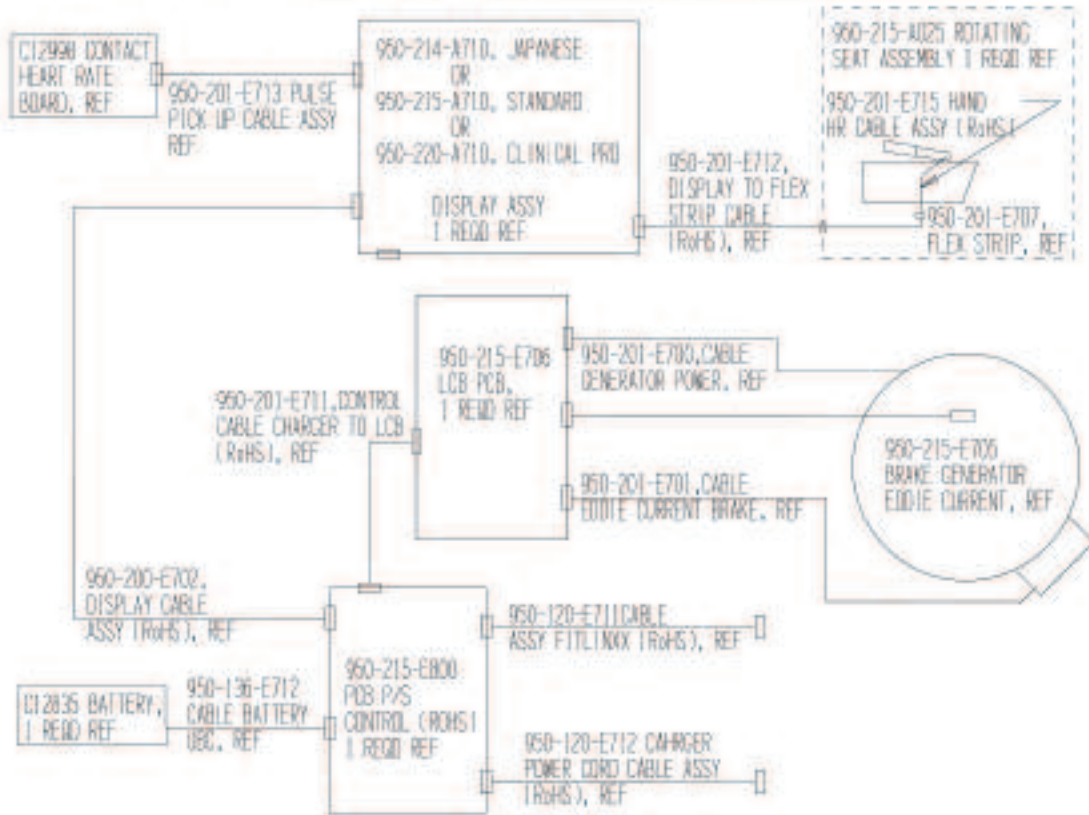
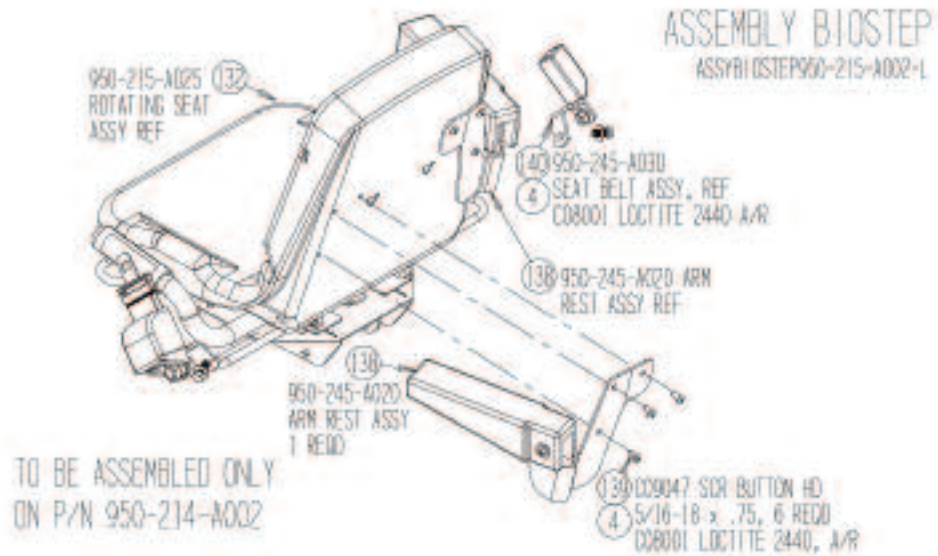


# ASSEMBLY B10STEP

ASSY:U10STEP950-215-4002-L



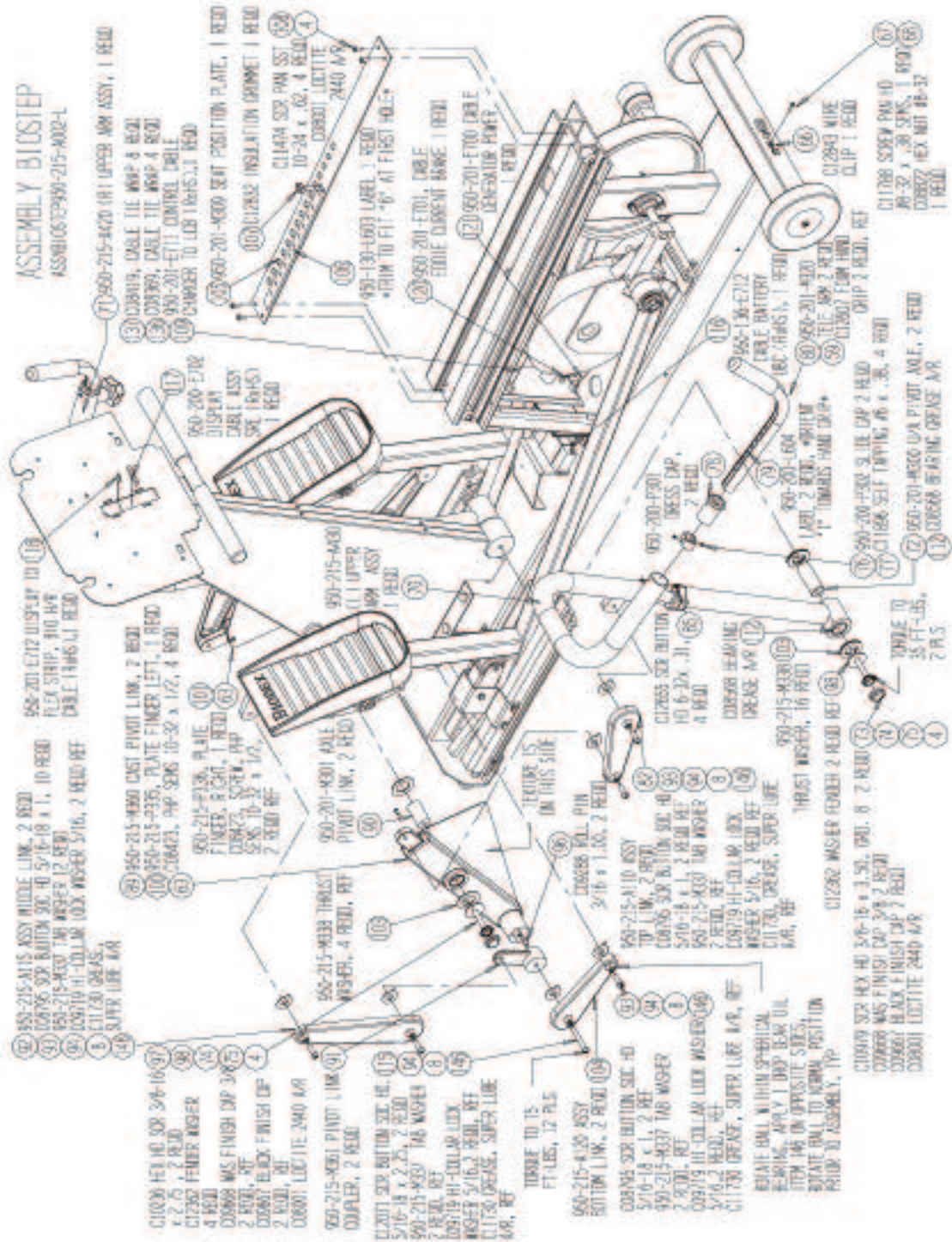
NOTES:  
 1. FITTING STRAPS ITEM 140 PAN 820-331-110, QTY 2 ARE TO BE INSTALLED ON ASSEMBLY 950-214-4002 ON L.  
 2. THIS DRAWING IS LABELED FOR THE FOLLOWING ASSEMBLIES:  
 950-214-4002, 950-215-4002 AND 950-220-4002





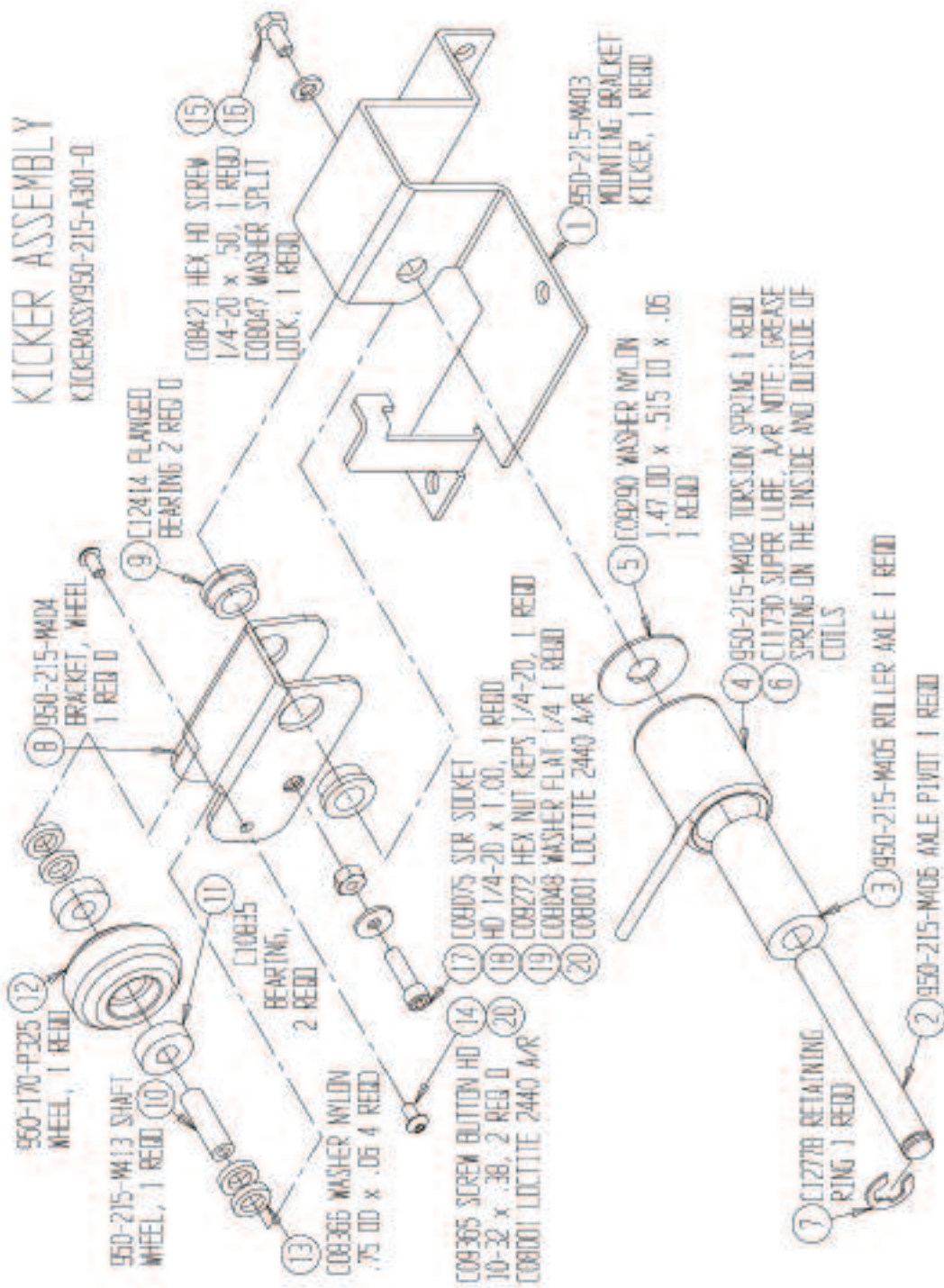
# ASSEMBLY BICSTEP

ASSEMBLY BICSTEP  
ASSEMBLY BICSTEP



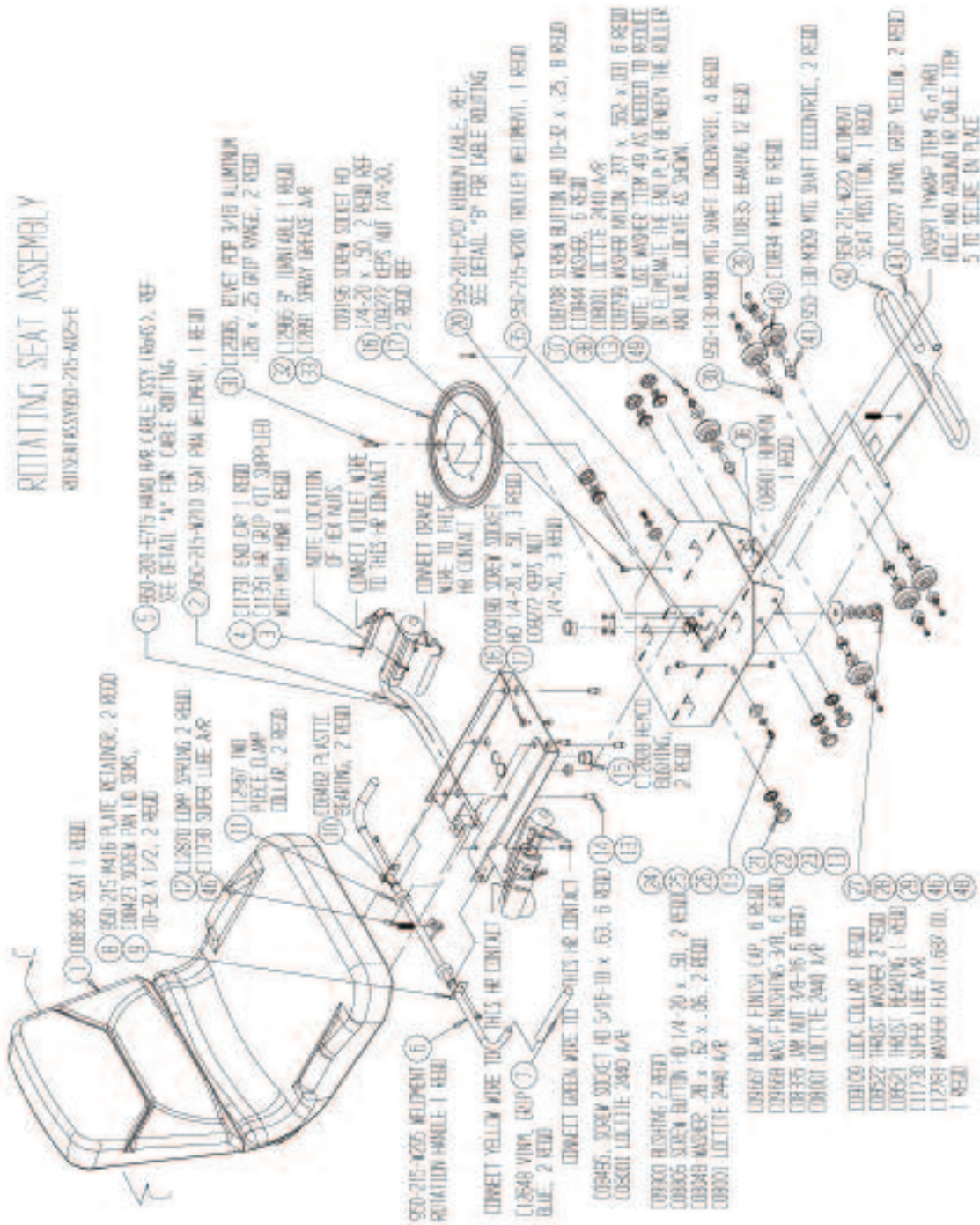






# ROTATING SEAT ASSEMBLY

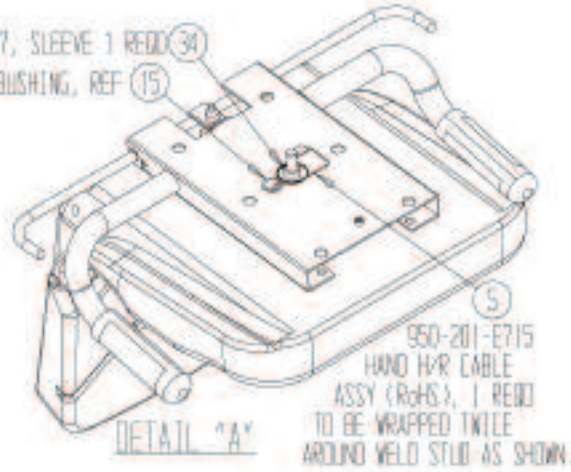
300VASSW001-215-6025-F



# ROTATING SEAT ASSEMBLY

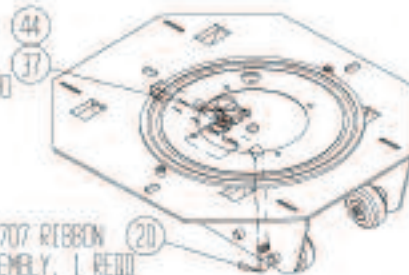
ROTSEATASSY950-215-A025-E

950-215-M417, SLEEVE 1 REQD  
 C12828 HEYCO BUSHING, REF



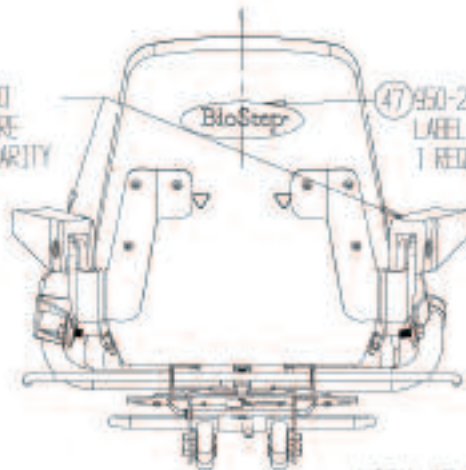
950-201-M311 CLAMP  
 PLATE, 1 REQD  
 C08708 SCREW BUTTIN HD  
 10-32 x .25, 2 REQD  
 (REF)

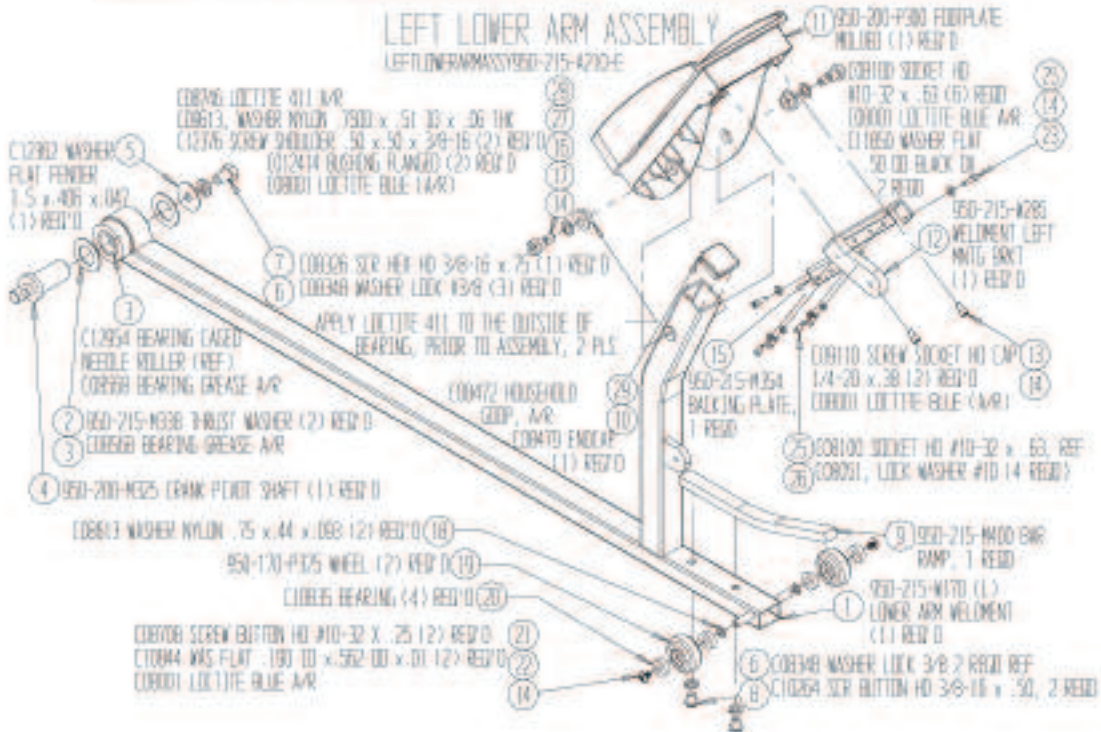
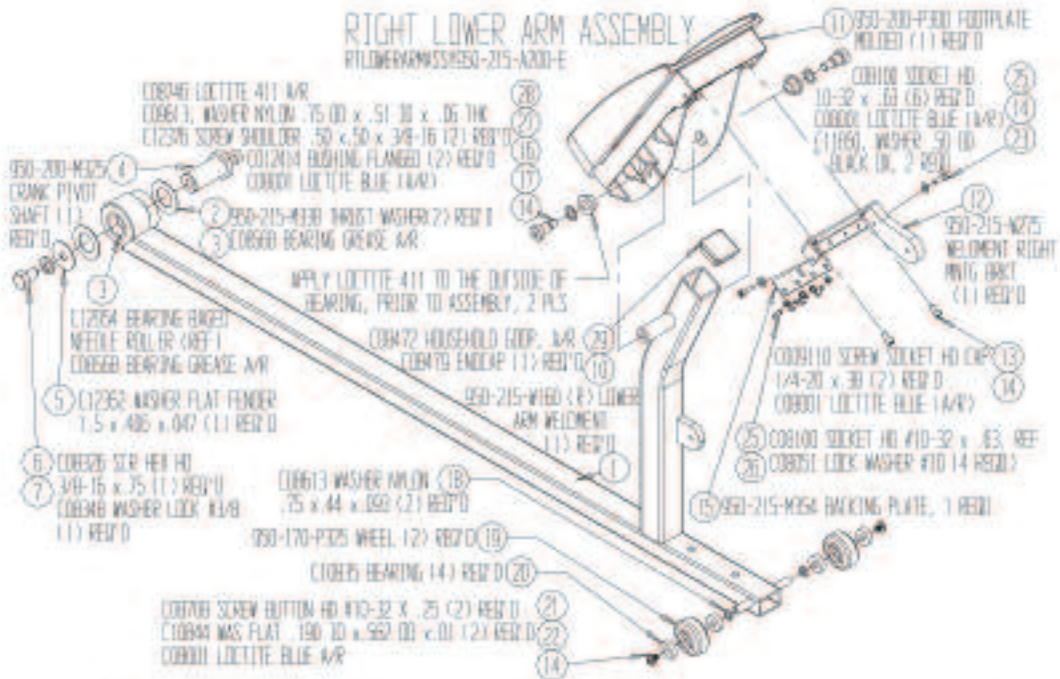
950-201-E707 RIBBON  
 CABLE ASSEMBLY, 1 REQD  
 ROUTE CABLE AS SHOWN



ARM RESTS AND  
 SEAT BELTS ARE  
 SHOWN FOR CLARITY

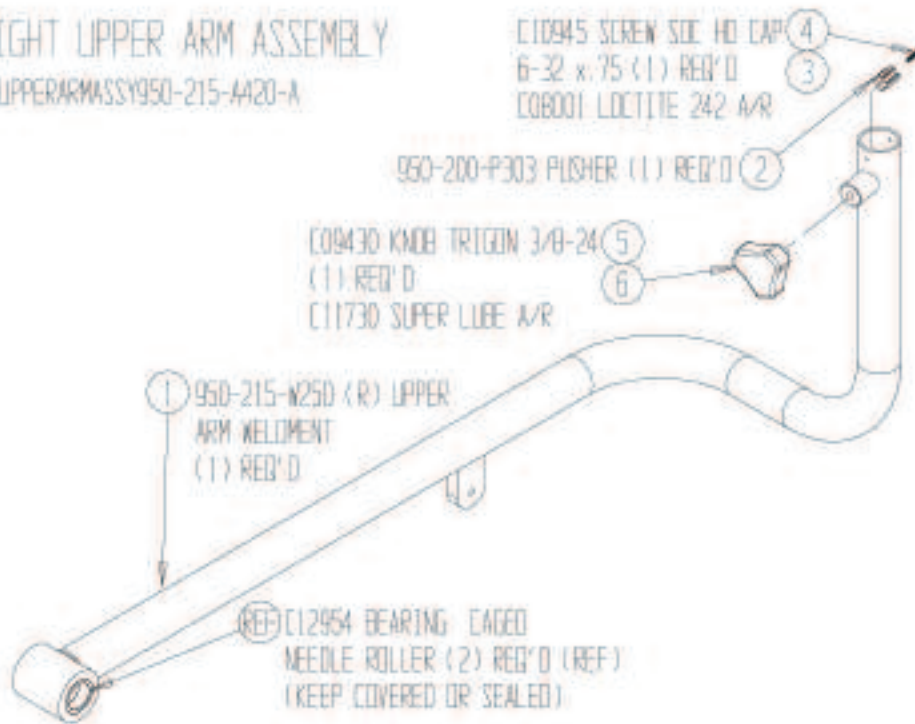
47 950-215-L600  
 LABEL SEAT BACK  
 1 REQD





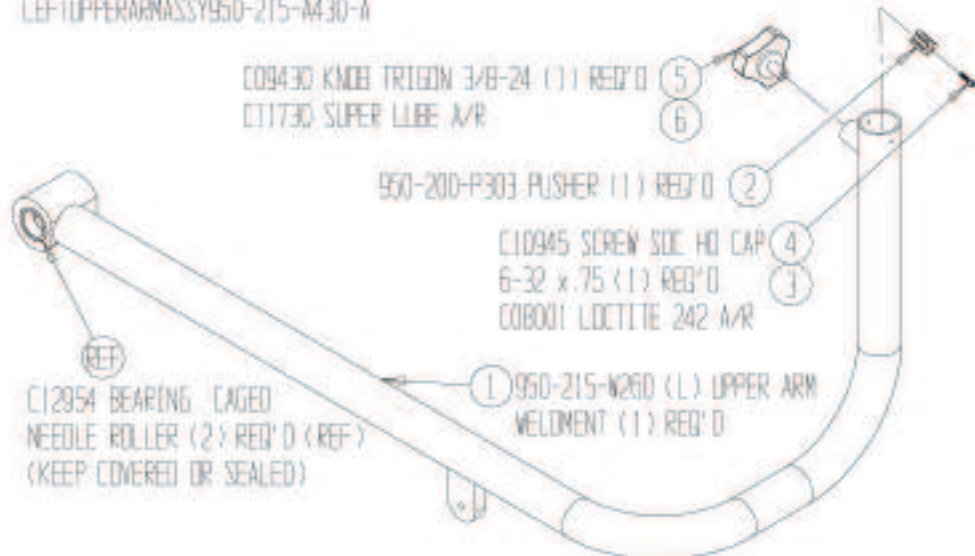
## RIGHT UPPER ARM ASSEMBLY

RTUPPERARMASSY950-215-A420-A



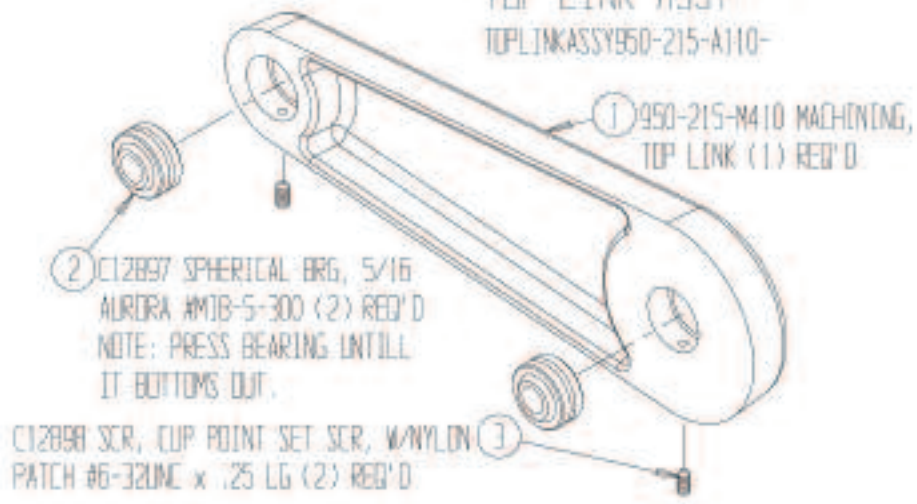
## LEFT UPPER ARM ASSEMBLY

LEFTUPPERARMASSY950-215-A430-A



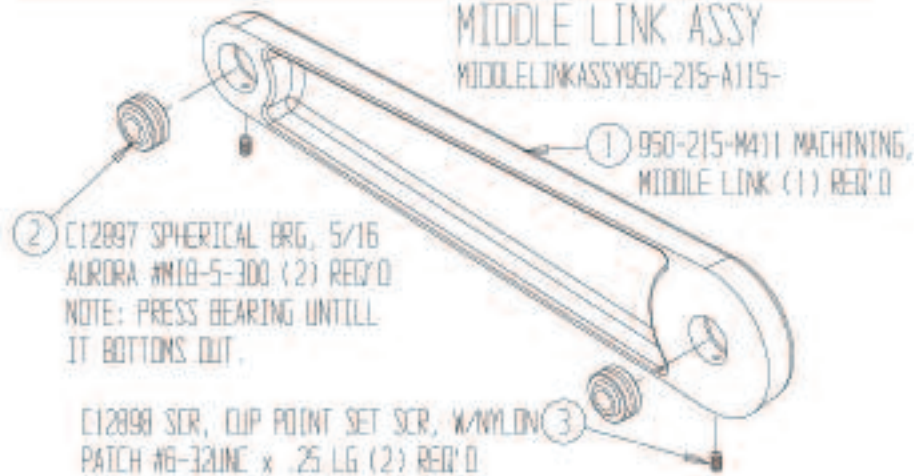
### TOP LINK ASSY

TOPLINKASSY950-215-A110-



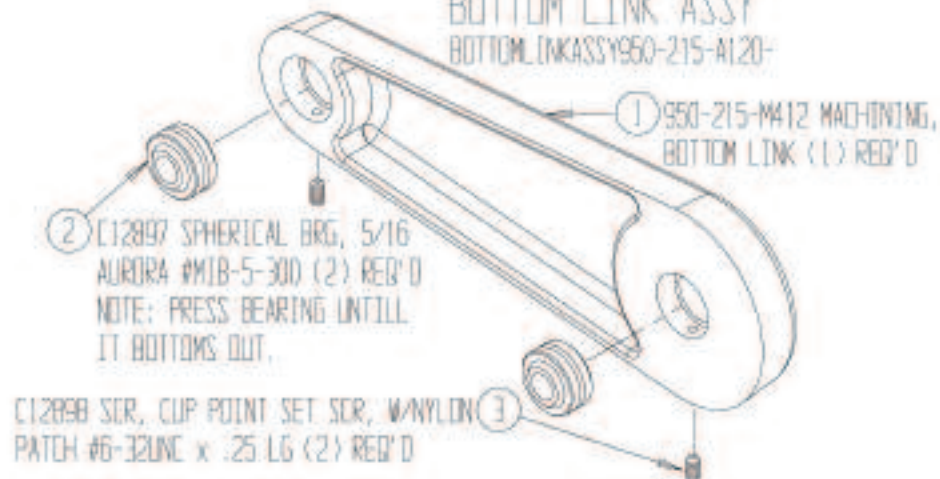
### MIDDLE LINK ASSY

MIDDLELINKASSY950-215-A115-



### BOTTOM LINK ASSY

BOTTOMLINKASSY950-215-A120-



# NOTES

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*Certified Quality Management System*

# BIODEX

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