BIOSTEP® 2

APPLICATION/OPERATION MANUAL

950-240

BIODEX
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BioStep® 2

This manual covers installation and operation procedures for the following products:

950-240 BioStep® 2, 100-230 VAC

NOTE: *All or some of the following symbols, cautions, warnings and notes may apply to your BioStep 2 and correspond to this operation manual:*

Symbol	Meaning
⚠	*DANGER: will result in an imminently hazardous situation if not avoided.*
⚠	*WARNING: will result in a potentially hazardous situation if not avoided.*
⚠	*CAUTION: may result in a potentially hazardous situation if not avoided.*
⚠	*ATTENTION: consult accompanying documents.*

Symbol	Signification
⚠	*DANGER : aura comme conséquence une situation d'une manière imminente dangereuse sinon évitée.*
⚠	*AVERTISSEMENT : aura comme conséquence une situation potentiellement dangereuse sinon évitée.*
⚠	*ATTENTION : peut avoir comme conséquence une situation potentiellement dangereuse sinon évitée.*
⚠	*ATTENTION : consultez les documents d'accompagnement.*

⚠ ***CAUTION:*** *Federal law restricts this device to sale by or on the order of a medical practitioner. When prescribed for therapeutic purpose, a physician should clearly define the parameters of use (i.e., total work, maximum heart rate, etc.) to reduce the risk of patient injury.*

Table of Contents

1. Features

The BioStep 2 Semi-Recumbent Elliptical Trainer meets the demands of neurorehabilitation, orthopedic, cardiopulmonary, sports medicine, wellness, and general conditioning programs. Designed for versatility and durability, these devices can be used virtually anywhere - in the gym, the clinic, the home, or even out-of-doors on the athletic field.

With its feature-rich design, the BioStep 2 can accommodate a wide variety of user profiles. These features are summarized below.

- Work range of up to 600 watts (120 rpm) with 20 resistance settings supports users at all levels - from weak, deconditioned, or post-operative patients to highly conditioned athletes
- Indexed track with extensive front-to-back adjustment allows correct biomechanical positioning for users from 4 feet 6 inches to 6 feet 10 inches in height and weighing up to 500 pounds
- Adjustable arms accommodate a wide range of upper extremity motions
- Ergonomic step-through design with seat rotation for easy access - even for those with limited mobility
- Contoured seat with lumbar support to ensure user comfort
- Quick-start operation to enable users to begin exercising immediately
- Easy-to-read, configurable LED display with accurate data reporting in real-time provides immediate user biofeedback for increased motivation and compliance
- Heart-rate monitoring using dual contact handgrips or via the compatible Polar chest strap telemetry.
- Self-powered, self-charging, cordless capability for use in any environment, even out-of-doors
- Large wheels for easy mobility
- Optional Stabilization Kit (model 950-241) containing hand and foot straps, a seat belt, and arm rests is available for added user safety

NOTE: *Please refer to Section 7, Installation, for site requirements and battery charging instructions before using the BioStep 2.*

2. Identifying Parts & Adjustment Mechanisms

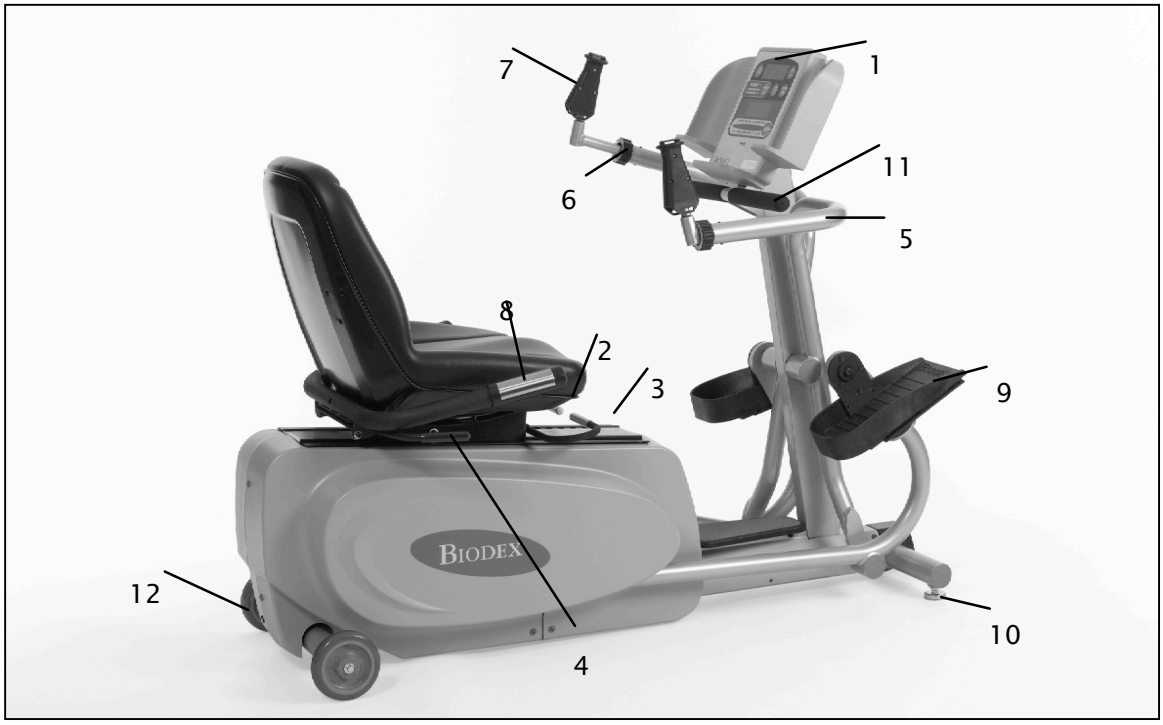


Figure 1. *Side View of BioStep 2*

The BioStep 2 includes the following parts and adjustment mechanisms:

1. *Display Panel*
2. *Seat Front-to-Back Release Handle (yellow)*
3. *Indexed Track*
4. *Seat Rotation Handle (blue)*
5. *Arm Cranks*
6. *Lock Knobs (for arm adjustment)*
7. *Pivoting Handgrips*
8. *Support Handgrips with Contact Heart Rate Monitoring*
9. *Footplates*
10. *Leveling Glides (2, one on each side and one in front)*
11. *Grab Handle*
12. *AC Adapter Battery Recharge Jack*

Figure 2. *Rear View of BioStep 2*

3. Making Adjustments

With the BioStep 2, you can make the adjustments described below for easy access and correct positioning.

Rotating the Seat

(See Figure 3.)

The seat can be rotated 90˚ in either direction. To rotate the seat, follow the steps below.

1. Lift the blue Seat Rotation Handle located underneath the seat back.
2. Rotate the seat 90˚ to the right or the left until the seat snaps into place.

Figure 3. *Rotating the BioStep 2 Seat*

Adjusting the Distance between the Seat and the Footplates

(See Figure 4.)

The seat can be slid forward and back along a 15-inch track numbered from 3 to 13. To move the seat, follow the steps below.

1. Lift the yellow Seat Front-to-Back Release Handle located below the seat front.
2. Slide the seat forward and back along the Indexed Track.

Figure 4. *Adjusting the BioStep 2 Seat*

Adjusting the Arm Lengths

(See Figure 5.)

The arm extensions can be slid in and out along a scale numbered from 1 to 7. To adjust the arm lengths, follow the steps below.

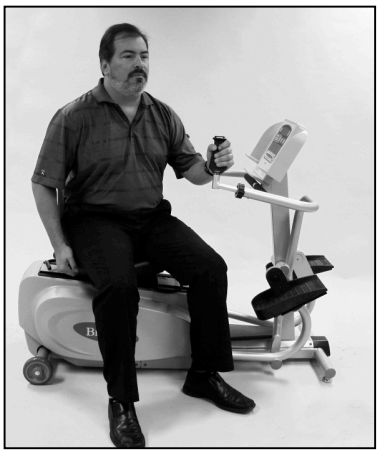
1. Turn the Lock Knob on each Arm Crank 1/4 turn to the left to loosen.
2. Hold the Pivoting Handgrips and slide the arm extensions out or in to extend or retract the arms.
3. Turn each Lock Knob 1/4 turn to the right to tighten.

Figure 5. *Adjusting the BioStep 2 Arm Lengths*

Once you familiarize yourself with these adjustments, follow the steps below to assist users in getting on and off the BioStep 2, and to size the BioStep 2 so users can exercise comfortably.

Easy-on Instructions

1. Adjust the seat distance. Lift the yellow handle and slide the seat backward along the track.
2. Rotate the seat 90˚. Lift the blue handle and move the seat towards the user until the seat snaps into place.
3. If necessary, have the user hold the Grab Handle for stability before sitting down.
4. Rotate the seat 90˚. Lift the blue handle and return the seat to its original position.



Easy-size Instructions

1. Place feet on the Footplates.
2. Adjust the seat distance. Lift the yellow handle and slide the seat forward along the track. The seat is positioned correctly when the user's knees are flexed slightly.

   NOTE: *The knees should not be locked.*

3. Extend the arms as needed. Turn the knobs 1/4 turn to the left to loosen, slide the arm extensions out, and turn the knobs back to the right to tighten.

Easy-off Instructions

1. Retract the arms. Turn the knobs 1/4 turn to the left to loosen, slide the arm extensions in, and turn the knobs back to the right to tighten.
2. Adjust the seat. Lift the yellow handle and slide the seat backward along the track.
3. Rotate the seat 90˚. Lift the blue handle and move the seat away from the Display Panel until the seat snaps into place.
4. If necessary, have the user hold the Grab Handle for stability before standing up.

4. Operating the Biostep 2

Basic Safety Instructions

Biodex has designed and tested the BioStep 2 for safety, durability, and superior functionality. To ensure years of continual use, please review the important safety instructions listed below.

1. Read all instructions in this manual before operating the BioStep 2.
2. Use the BioStep 2 only for its intended purpose as described in this manual.
3. Do not add any devices onto the BioStep 2 other than those recommended by Biodex Medical Systems, Inc.
4. Except as instructed for use of the BioStep 2, keep hands and feet away from all moving parts.
5. Keep small children away from the pedals and arm cranks while the BioStep 2 is in use. Unsupervised children should never be allowed near the BioStep 2.
6. Keep the electrical cord away from heated surfaces and out of all travel lanes.
7. Do not use the BioStep 2 out-of-doors when connected to an electrical outlet. Use the BioStep 2 out-of-doors only in self-powered mode. When powered at work rates of at least 30 watts and 50 rpm, the BioStep 2 operates at low voltage (6 volts).
8. When exercising legs only and hands will not be on handgrips, it is recommended that armrests be in the up and away position and/or handgrips compressed into arms all the way. This will avoid any chance of BioStep handgrips hitting the armrests or the person exercising, hands or arms should they be on the armrests.

Clinical Considerations

⚠ ***CAUTION:*** *Certain considerations must be ensured before a user begins any type of exercise program. A brief summary of the points to consider is provided below.*

1. Before undertaking a rigorous exercise program on any type of interactive rehabilitation equipment, the user should get medical clearance. This is especially important for those with a past history of heart rate problems or known risk factors including elevated blood pressure, hyperlipidemia, diabetes, obesity, sedentary life style, smoking, and a family history of cardiovascular disease.
2. The user should be comfortably seated and the distance between the seat and the footplates, as well as the arm lengths, should be adjusted as necessary for correct positioning. Seat position affects both the knees and the hips. Moving the seat closer to the foot pedals increases flexion. Conversely, moving the seat away increases extension. Arm length affects the shoulders.
3. The user should allow a minimum of 3 to 5 minutes to warm up before beginning the actual exercise session and another 3 to 5 minutes to warm-down at the end of each session. During these periods, the exercise intensity should be gradually increased and decreased to avoid suddenly taxing the heart and circulation system, help prevent injury to the muscles and joints, and reduce muscle soreness.
4. The user should start at a safe exercise level and avoid overexertion. Symptoms of overexertion may include, but are not limited to: dizziness, nausea, pain or discomfort, and shortness of breath or difficulty breathing.

Powering Up the BioStep 2

Once you have charged the internal battery (see Section 7, Installation, for battery charging instructions), a user can power up the BioStep 2 even if the battery is not connected to an electrical outlet. As long as the user pedals at a rate of at least 30 watts or 50 rpm, the battery continues to charge automatically.

To power up the BioStep 2, simply begin pedaling or moving the arm cranks, or both. The Display Panel lights to indicate that the BioStep 2 is on.

NOTE: *The BioStep 2 does not have an ON/OFF switch.*

Figure 6: *The Display Panel*

Once the Display Panel lights, the following default factory settings are in effect:

1. The Effort Level defaults to 1, for lowest resistance.
2. The Time **00:00** appears in the upper window of the Display Panel and is incremented in units of one minute during exercise.
3. The Weight defaults to 150 lbs.

The BioStep 2 begins collecting and calculating data for each of the eight fitness measurements shown in the oval below the lower window. These measurements are listed below.

WATTS→RPM→CALORIES→METS→STEPS→HEART RATE→DISTANCE

As the BioStep 2 scrolls through the measurements, the green LED next to each measurement lights, in turn, and the data associated with that measurement appears in the lower window.

NOTE: *The HEART RATE LED lights only when the user either holds both Handgrips or uses the Wireless Chest Strap. (See Section 5, Monitoring the Heart Rate, for additional information.)*

Exploring the Display Panel

The buttons on the Display Panel allow the user to change or reset the factory default settings, select a particular fitness measurement for continuous display, advance to another measurement, resume scrolling, and clear all display settings.

NOTE: *The user can stop pedaling to make these changes or make them while continuing to pedal.*

Use the areas to the left and right of the display to hold a beverage and the shelf at the bottom for reading material.

Changing the Resistance Level

The BioStep 2 features 20 resistance settings numbered from one to 20. As the resistance level is raised from 1, the default, the effort that must be expended to pedal the BioStep 2 is increased. To change the resistance level, follow the steps below.

1. Press the **SET EFFORT LEVEL Button**. The current Effort Level appears in the upper window.
2. To raise or lower the resistance level in increments of 1, repeatedly press the +/- **Button**. Each new effort level is displayed in the upper window.

Setting the Exercise Duration Timer

The exercise duration timer operates either in count-up or count-down mode. In both modes, the time changes in one minute intervals during exercise. The total exercise time must be set only for count-down mode. As the user exercises, the time decreases in one minute intervals. To set the exercise duration timer, follow the steps below.

1. Press the **SET TIME Button**. The current time appears in the upper window.
2. To increase or decrease the time in increments of one minute, repeatedly press the +/- **Button**.

Changing the Weight

Weight is used to calculate values for both the CALORIES and METS (Metabolic Equivalents) measurements. (See Section 6, Explaining METs, Calories, and Watts, for an explanation of METS and the relationship of calories burned to oxygen consumption.)

Weight can be set in either English (lb) or metric (kg) units. (See Configuring the BioStep 2 in this section for detailed instructions.) The factory default weight setting is 150 lb or 70 kg and the maximum weight setting is 500 lb or 227 kg. To change the weight, follow the steps below.

1. Press the **SET WEIGHT Button**. The current weight appears in the upper window.
2. To increase or decrease the weight in units of 5 lb or 2 kg, repeatedly press the +/- **Button**. The new weight is used to calculate CALORIES and METS going forward, and the new calories are added to the calories calculated at the previous weight.

NOTE: *To increase the weight setting to the maximum (500 lb or 227 kg), press and hold the +* ***Button****.*

Scrolling Through the Fitness Measurements

During the exercise session, the BioStep 2 captures data in real-time for the following eight fitness measurements:

WATTS→RPM→CALORIES→METS→STEPS→HEART RATE→DISTANCE

STEPS keeps track of the number of elliptical rotations the BioStep 2 makes when the pedals or the arm cranks are moved. (See Section 6 for an explanation of METs, CALORIES, and WATTS.)

The captured data automatically cycles through the lower window. A green LED indicates the fitness measurement being displayed. The user can halt the cycle at any time to select one of these measurements for continuous display. The user can also manually advance to the next measurement or return to automatic scrolling.

Use the **Scroll/Pause Display Button** (❙❙ ►) to alter the display, as follows:

- To halt automatic scrolling at the current measurement, press the **Scroll/Pause Display Button** once.
- To manually advance to the next measurement, press the **Scroll/Pause Display Button** again.
- To restart automatic scrolling, press and hold the **Scroll/Pause Display Button** for two seconds.

Clearing Display Settings

To restore the default factory settings - an Effort Level of 1, a Time of 00:00, and a weight of 150 lb or 70 kg - and to reset all fitness measurements to zero, press the reset Button.

NOTE: *The BioStep 2 clears these measurements automatically one minute after pedaling stops unless a button is pressed on the Display Panel.*

Pausing and Resuming Operation

Once pedaling stops, scrolling ceases. The user has 60 seconds to review the accumulated TIME, STEPS, DISTANCE, and CALORIES measurements before the measurements are reset to zero. If pedaling resumes within 60 seconds, the BioStep 2 continues to accumulate data.

Shutting Down the Display

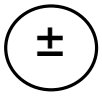
The display turns off automatically two minutes after pedaling stops unless a button is pressed on the Display Panel.

Configuring the BioStep 2

With the BioStep 2 powered on, information about the BioStep 2 can be displayed and the following changes can be made to the configuration to suit your personal preferences:

- Choose between English and metric units of measure
- Select when the beep is to sound

Use the following buttons in **Configuration Mode:**

- **Scroll/Pause Display Button** 
- **SET EFFORT LEVEL Button**
-  **Button**

To enter **Configuration Mode**, follow the steps below:

1. Press the **Scroll/Pause Display Button** and the **SET EFFORT LEVEL Button** at the same time. The resistance mode, **CrES** for Constant Resistance Control, appears in the upper window.

   NOTE: *DO NOT CHANGE THIS SETTING. Constant Resistance Control is the correct mode of operation for the BioStep 2. This mode is the perfect choice for heart rate and pulmonary rehabilitation, as well as general aerobic conditioning, because the resistance level remains constant regardless of pedaling speed.*

2. Press the **Scroll/Pause Display Button** again to display the unit of measure setting in the upper window - either **EnGL** for English or **EUro** for metric.

   NOTE: *For English units, weight is displayed in pounds (lbs) and distance in miles. For metric units, weight is displayed in kilograms (kg) and distance in kilometers (km).*

3. To toggle between the English (**EnGL**) and Metric (**EUro**) settings, press the ± **Button**.

4. Press the **Scroll/Pause Display Button** again to display the following information about the BioStep 2. This information appears in the upper window.

   - Device type - **biO** for BioStep 2
   - Turn-on speed - **tOs** in rpm - a zero (**0**) appears in the lower window.

   NOTE: *DO NOT CHANGE THESE SETTINGS. These are correct for the BioStep 2.*

5. Press the **Scroll/Pause Display Button** again to select when the beep is to sound. The word "**beep**" appears in the upper window and the beep setting in the lower window. There are three choices:
   - **POn** - beep only when a button is pressed
   - **On** - beep whenever a button is pressed or the BioStep 2 scrolls to another fitness measurement
   - **OFF** - silence the beep
6. To toggle between the beep settings, press the ± **Button**.
7. Press the **Scroll/Pause Display Button** again to save the new configuration and exit Configuration Mode.

5. Monitoring the Heart Rate

With the BioStep 2, clinicians can easily monitor a user's heart rate during exercising. Whether the user uses the Support Handgrips with Contact Heart Rate Monitoring located on either side of the seat (see Figure 1) or with their own provided Polar Telemetry Chest Strap, the heart rate is transmitted to the Display Panel and displays in real-time in the upper window when the HEART RATE LED lights.

NOTE: *If you do not think the user's heart rate is being captured accurately, have the clinician take the user's pulse rate manually and compare the two rates.*

Using the Handgrips

To use the Handgrips, have the user grasp the stainless steel portion with each hand and hold on while exercising.

NOTE: *If the user's heart rate does not display, have the user reposition both hands on the Handgrips. Elderly users may need to use hand cream or water to improve signal strength.*

Using a Polar Wireless Chest Strap (not provided with the BioStep)

To use the wireless Chest Strap, follow the steps below.

1. Make sure the Polar Chest Strap Telemetry transmitter is compatible with the Polar Receiver.
2. Dampen the Chest Strap with a conducting gel, sponge, or wet cloth to ensure maximum conductivity.
3. Lift the user's shirt and secure the Chest Strap around the chest just below the breast so that it is in direct contact with the user's skin.
4. Have the user begin exercising and check to be sure the heart rate is being transmitted directly to the Display Panel.

NOTE: *If the user's heart rate does not display, adjust the Chest Strap to improve conductivity.*

Determining the Target Heart Rate Using the Chart

Medical authorities have developed a chart of estimated target heart rate ranges based on age for optimum cardiovascular benefit. The chart is designed for users with healthy hearts. You can use this chart as a guide, but be sure to make concessions based on individual needs.

Age	Estimated Attainable Heart Rate		
	Maximal	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

As a general rule, use the following equation to estimate the maximum heart rate for users with healthy hearts:

Maximum Heart Rate = 220 - user age in years

For example, for a heart-healthy, 30-year-old, the Maximum Heart Rate would be: 220 - 30 = 190 beats per minute

CAUTION: *When the BioStep 2 is prescribed for therapeutic purposes, maximum heart rate, as well as other fitness measurements, should be defined by a physician to reduce the risk of injury to the patient.*

6. Explaining METS, Calories and Watts

When you exercise, your body burns fat and releases energy or power. METs (Metabolic Equivalents), Exercise Calories, and Watts are terms that measure the amount of energy or power that is released.

What are METs (Metabolic Equivalents)?

METs, or metabolic equivalents, measure the rate of energy expended by estimating the amount of oxygen used by the body. One MET is equal to the amount of oxygen used by the body at rest. Everyone at rest expends energy at the same rate and uses the same amount of oxygen for each kilogram (or pound) of body weight, regardless of age or fitness level. One MET uses about 3.5 milliliters of oxygen per kilogram of bodyweight per minute (3.5 ml/kg/min).

During physical exercise, MET levels increase because the body consumes more oxygen. As oxygen is consumed, the body produces heat. Individuals utilize oxygen and expend energy at different rates depending on their fitness levels. Each increase in oxygen of 3.5 ml/kg/min increases the energy expenditure by 1 MET. The individual able to process more oxygen is more fit, and so can expend more energy and sustain a higher MET level.

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

MET charts have been developed by researchers to estimate the MET levels of domestic and recreational activities. Each type of physical activity and intensity level is assigned a MET value.

- Light-intensity activities are assigned values of from 1.1 to 2.9 METs
- Moderate physical activities are assigned values from 3 to 6 METs
- Vigorous activities are assigned values over 6 METs

These estimations are generalizations as to how many times individuals needs to elevate their metabolic rate (METs) to accomplish such activities.

METS And Cardiopulmonary Rehabilitation

METs are often used in prescribing exercise for patients involved in cardiopulmonary rehabilitation. Cardiovascular medical experts and physiologists can correlate METs to VO2 max, a measure of maximal oxygen consumption and conditioning. A cardiac stress test typically reports the maximum 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."

On each type of cardiovascular exercise machine, a user must exercise at a different work load (watts) to attain a consistent metabolic rate and a 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 pedaling a lower body cycle at 100 watts. It is up to the clinician to set the appropriate workloads on each ergometer to achieve the appropriate MET level.

NOTE: *Biodex Ergometers support METs and aid exercise prescription for both cardiopulmonary rehabilitation and medical fitness.*

Knowing the maximum METs (rate of energy expenditure) and VO2 max (maximum oxygen utilization capacity) of an individual is important for building an effective fitness program.

What are Exercise Calories?

By definition, one calorie is the amount of energy needed to heat 1 kg of water by 1 degree Celsius. A calorie is the equivalent of 4,200 joules. A joule is also a measure of energy.

When referring to exercise, calories are a measure of energy expenditure. Exercise calories are the number of calories you burn when you perform specific exercises, such as walking, jogging, and pedaling. Exercise calories are based on the following factors:

- your weight
- the type of activity
- the intensity level of the activity
- the duration or total exercise time

Exercise intensity measures the extra energy needed above the body's minimal energy requirements, or Basal Metabolic Rate (BMR), to perform the activity. Because measurement of actual exercise intensity requires oxygen uptake monitoring equipment, Biodex can only estimate exercise intensity using standard formulas for different types of activity. Thus, Exercise Calories are also an estimate.

NOTES:

1. Your BMR, or the number of calories your body burns at rest, depends on both sex and weight. To calculate your BMR, multiply your weight by 11 for a male or 10 for a female and then divide by 24 to get to your BMR in calories per hour. For example, the BMR in calories per hour for a 30-year-old male weighing 180 pounds would be:

   180 x 11 / 24 or 1980 / 24 = 82.5 calories per hour

2. Oxygen uptake, or VO2, is usually expressed as a rate per unit of body weight, or milliliters per kilogram per minute (ml/kg/min).

Once you know the MET value for a particular activity, you can calculate the number of calories burned per minute using the following formula:

Total Calories Burned/Minute = Duration in minutes x number of METs x 3.5 x weight in kg / 200

For example, the total number of calories burned in 1 minute by a 150 lb (70 kg) individual at rest is:

Total Calories Burned Per Minute = 1 minute x 1 MET x 3.5 x 70 kg
/ 200 = 3.5 x 70 / 200 = 245 / 200 = 1.2 calories per minute

If the same individual engages in moderate physical activity with a value of 4 METs, for a total of 30 minutes, the number of calories burned per minute would be:

Total Calories Burned Per Minute = 30 minutes x 4 MET x 3.5 x 70 kg / 200
30 x 4 x 3.5 x 70 / 200 = 29400 / 200 = 147 calories per minute

Relationship of Calories Burned to Oxygen Consumption and METs

(See Figure 7.)

For every liter of oxygen consumed by the body during continuous exercise, the body burns approximately 5 calories. Figure 7 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 minute. The individual must burn 5 calories each minute to supply the appropriate amount of energy for the exercise. This translates to 14.6 milliliters of oxygen for each kilogram of body weight per minute.

1,000 ml of oxygen / 68 kg of body weight = 14.6 ml/kg/min

To calculate the MET level, divide the oxygen consumption in ml/kg/min by 3.5.

14.6 ml/kg/min / 3.5 ml/kg/min= approximately 4 METs

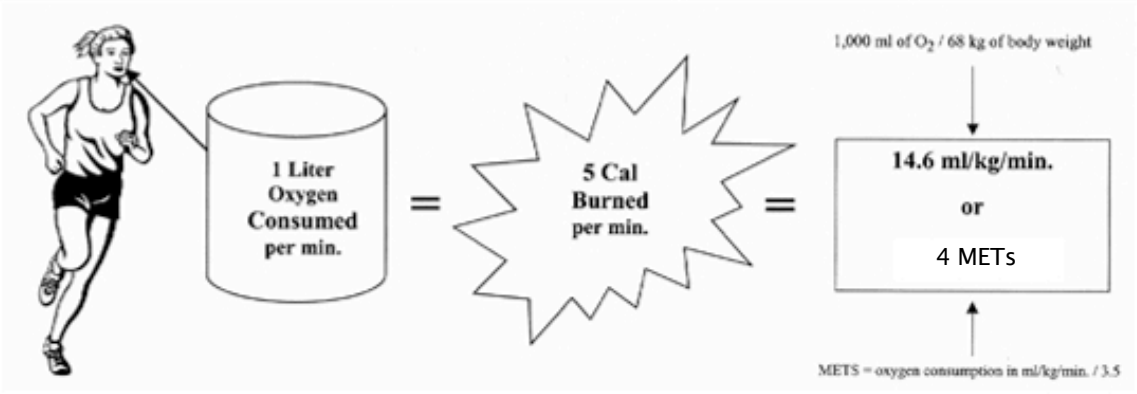


Figure 7. *Calculating METs*

NOTE: *In a study designed to examine the test-retest reliability and concurrent criterion validity of VO2 max on the BioStep 2 in community-dwelling older adults, results provided preliminary evidence of reliable and valid estimates of oxygen consumption by the BioStep 2 when compared with the criterion standard of direct VO2 max 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.

What are Watts?

Watts are a measure of power - the rate at which energy is produced. Watts measure the amount of energy you burn per second when you exercise. One watt is defined as one Joule per second, which is equivalent to about 4.2 calories per hour. If you exercise at 42 Watts for 100 seconds, you would burn 4200 joules or 1 calorie.

7. Installation

The BioStep 2 is shipped fully assembled and ready for use. Once you have removed the BioStep 2 from its shipping container, simply roll the BioStep 2 to an appropriate site and charge the battery.

If you have purchased the Optional Stabilization Kit containing hand and foot straps, a seatbelt, and armrests, you will find instructions for installing the kit in this section.

Site Requirements

Site requirements for the BioStep 2 are listed below.

1. The site should have a level floor surface. However, if the surface is uneven, use a 1/2-inch, open-end wrench to adjust the Leveling Glides until they engage with the floor.

⚠ ***CAUTION:*** *Do not use the BioStep 2 unless it is both level and stable.*

2. There must be sufficient free space around the BioStep 2 for easy user access and to prevent injury to others standing or walking nearby. A minimum of two feet of free space along the sides of the BioStep 2 and at least six inches of free space at the front and rear of the BioStep 2 are recommended.
3. An appropriate outlet that is properly installed and grounded in accordance with local codes and ordinances must be positioned nearby. The BioStep 2 is shipped with an AC line cord containing or including an equipment-grounding conductor and a grounding plug for proper grounding of the product. In the unlikely event of a malfunction or breakdown, grounding reduces the risk of electric shock by providing a path of least resistance for electric current.

DANGER: *Improper connection of the equipment-grounding conductor can result in 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.*

Charging the Internal Battery

Because the BioStep 2 is shipped without the internal battery charged, you must connect the battery to an electrical outlet during the first 24 hours of use. Once the battery has been charged, it will recharge automatically at work rates of 30 watts or more and speeds of at least 50 rpm, so the power cord may be removed. In this mode, the battery operates at low voltage (6 volts) and does not require grounding.

NOTE: *Biodex recommend that you plug in the AC Adapter overnight to keep the BioStep 2 battery charged to full capacity.*

To charge the battery, follow the steps below:

1. Plug one end of AC Adapter Cord into AC Adapter Battery Recharge Jack located at rear base of the BioStep 2.
2. Plug the other end of the cord into a properly installed and grounded outlet.
3. Be sure to keep the electrical cord away from heated surfaces and out of all travel lanes.

8. Maintenance and Service

The BioStep 2 has been designed to provide many years of dependable use. To help ensure that this product performs according to maximum specifications and to increase the life of the product, please note the following general cleaning instructions and maintenance procedures:

Daily Maintenance

NOTE: *Do not use cleaning solutions containing ammonia.*

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.

Annual Maintenance

1. Check to be sure all functions operate properly.
2. Inspect the seat for stability.
3. Check for any signs of wear.
4. Check for noisy components.

Diagnostic Mode

Certain information and various tests are available only from Diagnostic Mode. To view this information and run the diagnostic tests, follow the steps below.

1. Begin pedaling to power-up the BioStep 2. Once the display panel lights, you do not have to continue pedaling.
2. To enter Diagnostic Mode, press the Scroll/Pause Button and the Weight Button at the same time.
3. Press the Scroll/Pause Button by itself to scroll through the following information:

Upper Window	**Lower Window**
firmware release version	(release number)
total number of hours of operation	**HRS**
LOAd - used to test the resistance mechanism	**0** - increase for test purposes
EE - electrically erasable PROM	**055**
Atod - value of A to D converter indicates how much current is being passed through BioStep 2	**0**
LED	**8.8.8.8** - flashes from upper to lower window and to upper window again to test for defective segments

4. To exit Diagnostic Mode, either:

a. Press the **Scroll/Pause Button** again, or

b. Leave the BioStep 2 in Diagnostic Mode for one minute (whether or not anyone is exercising).

You will hear a long beep and the display will default to the power-up condition.

9. Specifications

Dimensions: 54" l x 28" w x 44" h (137 x 71 x 112 cm)
Resistance: Constant resistance: 20 settings
Work Rate Range: Up to 600 watts (120 rpm)
Readouts:
- TIME
- RPMS
- WATTS
- CALORIES
- METS
- HEART RATE
- DISTANCE
- STEPS

Heart Rate Monitoring: Contact handgrips or Polar® Telemetry (chest strap) compatible
User Capacity: 500 lb (227 kg)
Weight: 202.5 lb (92 kg)
Power: Self-powered; battery automatically recharges at work rates over 30 watts and 50 rpm without external power. 115 VAC adapter (230 VAC available) provided for initial battery charge, to keep the BioStep 2 battery charged to full capacity overnight, and for work rates below 30 watts and 50 rpm.
Certifications: ETL listed to UL 60601-1 and CAN/CSA C22.2 No.:601.1-M-90. EMC compliance to EN 60601-1-2.
Classification: Class I measuring, Type B, ordinary equipment, continuous operation
Warranty: Two-years on parts; one-year on labor
Manufacturer:

Biodex Medical Systems, Inc.
20 Ramsey Road
Shirley, NY 11967-4704

Intertek

Authorized European Community Representative:

EC REP

Emergo Europe
Molenstraat 15
2513 BH, The Hague
The Netherlands

Options:

950-241	Stabilization Kit, Basic *Includes: foot straps, hand straps, seat belt and movable armrests*
950-242	Stabilization Kit, Advanced *Includes: foot straps, hand straps, seat belt, movable armrests, pivoting calf support, padded foot restraint and hand/wrist cuffs*

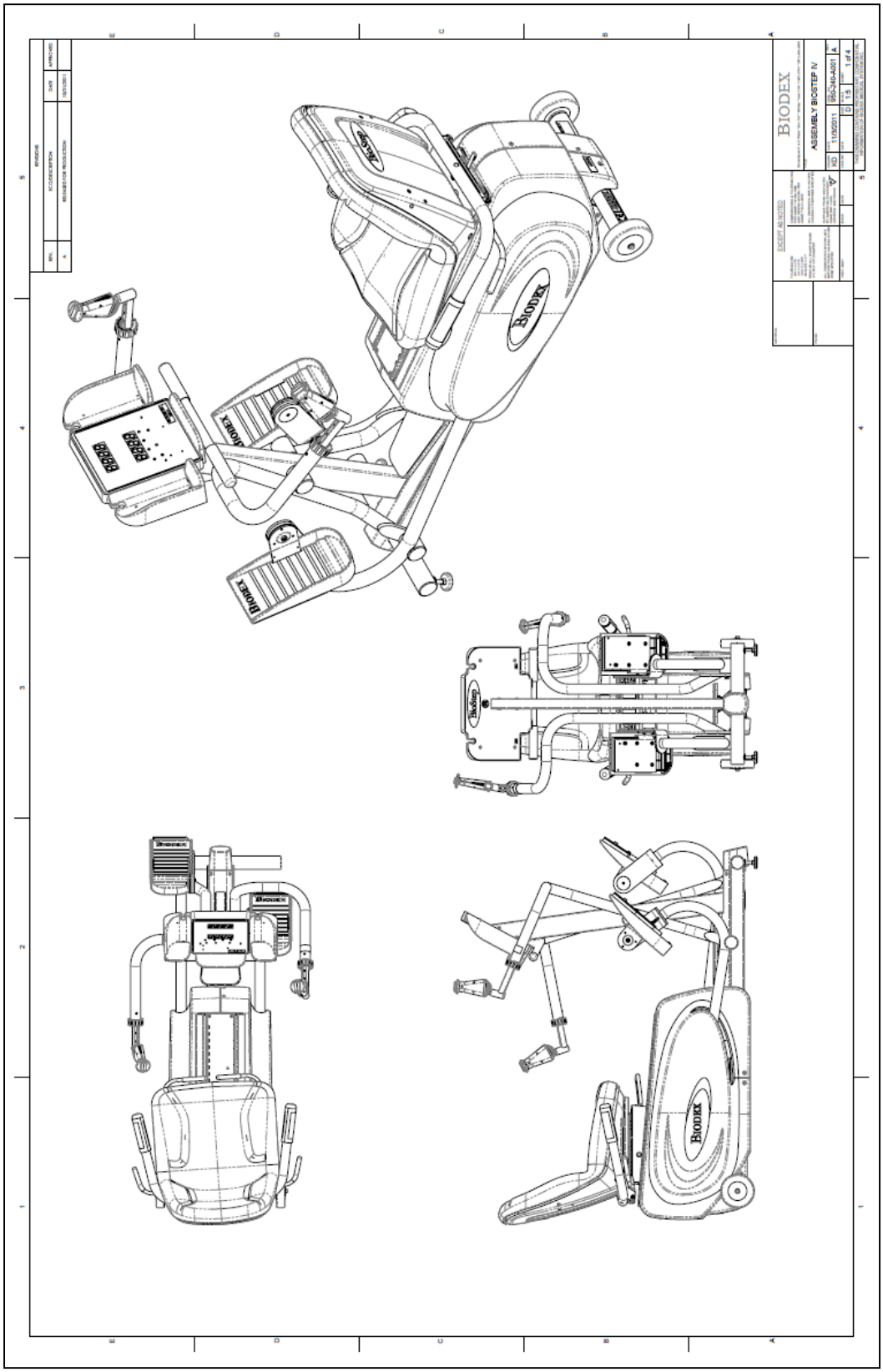
10. Electromagnetic Compatibility

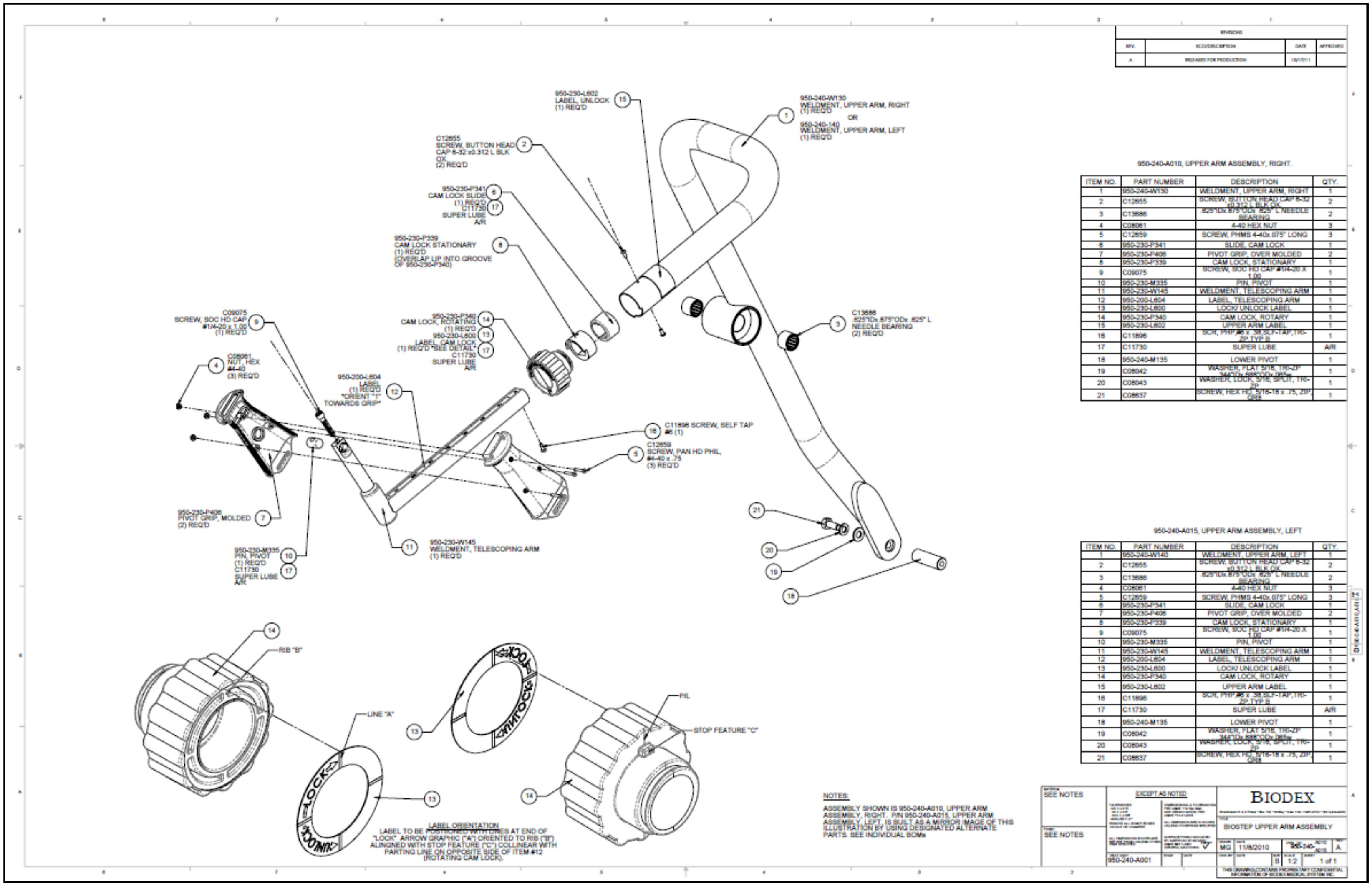
Electromagnetic compatibility tables for both BioStep 2 models are provided in this section.

BioStep 2

Standard	Test Method	Range			Limits	Result
IEC 61000-3-2	Harmonics	100 Hz to 2KHz			Class A	THD = 131.54%
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% 3.3% .2 sec 1.00 .65	- 0.00 % 0.00 % 0.00 sec 0.00 0.00
IEC 61000-4-2	Electrostatic Discharge	Contact: 2, 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 complied
IEC 61000-4-6	Conducted Immunity, Power Leads	Freq Range 150 KHz to 80 MHz /3Vrms Modulation 1khz, 80%, AM			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	**Int Duration**	**Pause Between**	**% Reduction**	no degradation of performance	complied
		Int 20msec	pause 10 sec	>100%	no degradation of performance	complied
		Int 100msec	pause 10 sec	60%	no degradation of performance	complied
		Int 500msec	pause 10 sec	30%	no degradation of performance	complied
		Int 5000msec	pause 10 sec	>100%	no degradation of performance	complied
CISPR 11 Edition 4: 2003	Conducted Emissions	150 KHz - 500 KHz / 500KHz - 5MHz / 5 MHz - 30 MHz, Class B, Group 1			66-56 / 56/ 60 dbuV QP 56-46 / 46 / 50 dbuV AV	complied
CISPR 11 Edition 4: 2003	Radiated Emissions	30 MHz - 230 MHz / 230MHz - 1GHz, Class B, Group 1			30/37 dbuVm @ 10 m	complied
IEC 61000-4-5	Surge Immunity, Power Leads	.5 & 1 Kv, Differential 1ppm, pos/neg .5, 1, & 2Kv Common 1ppm, pos/neg			no degradation of performance	complied

11. Replacement Parts



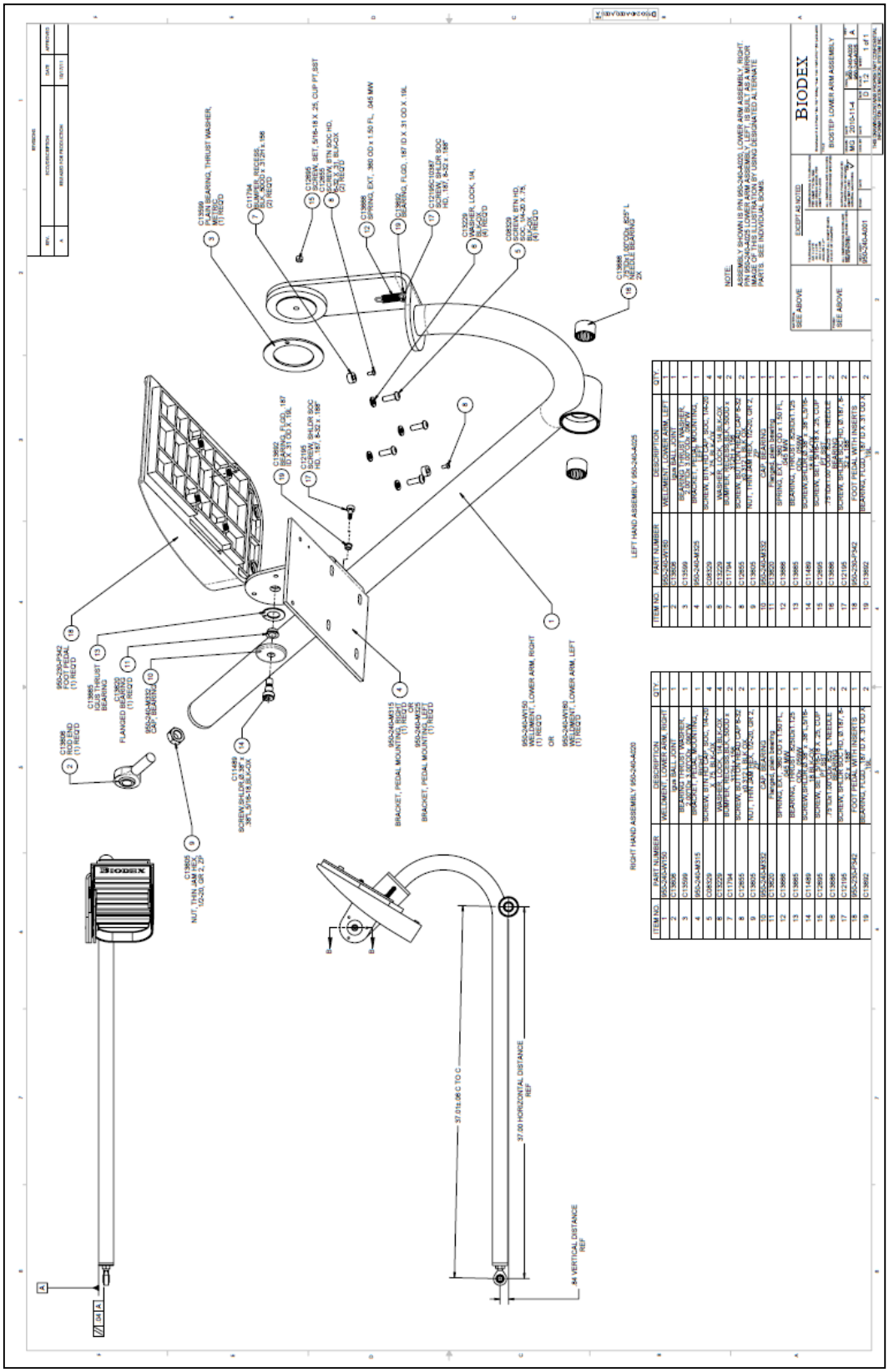


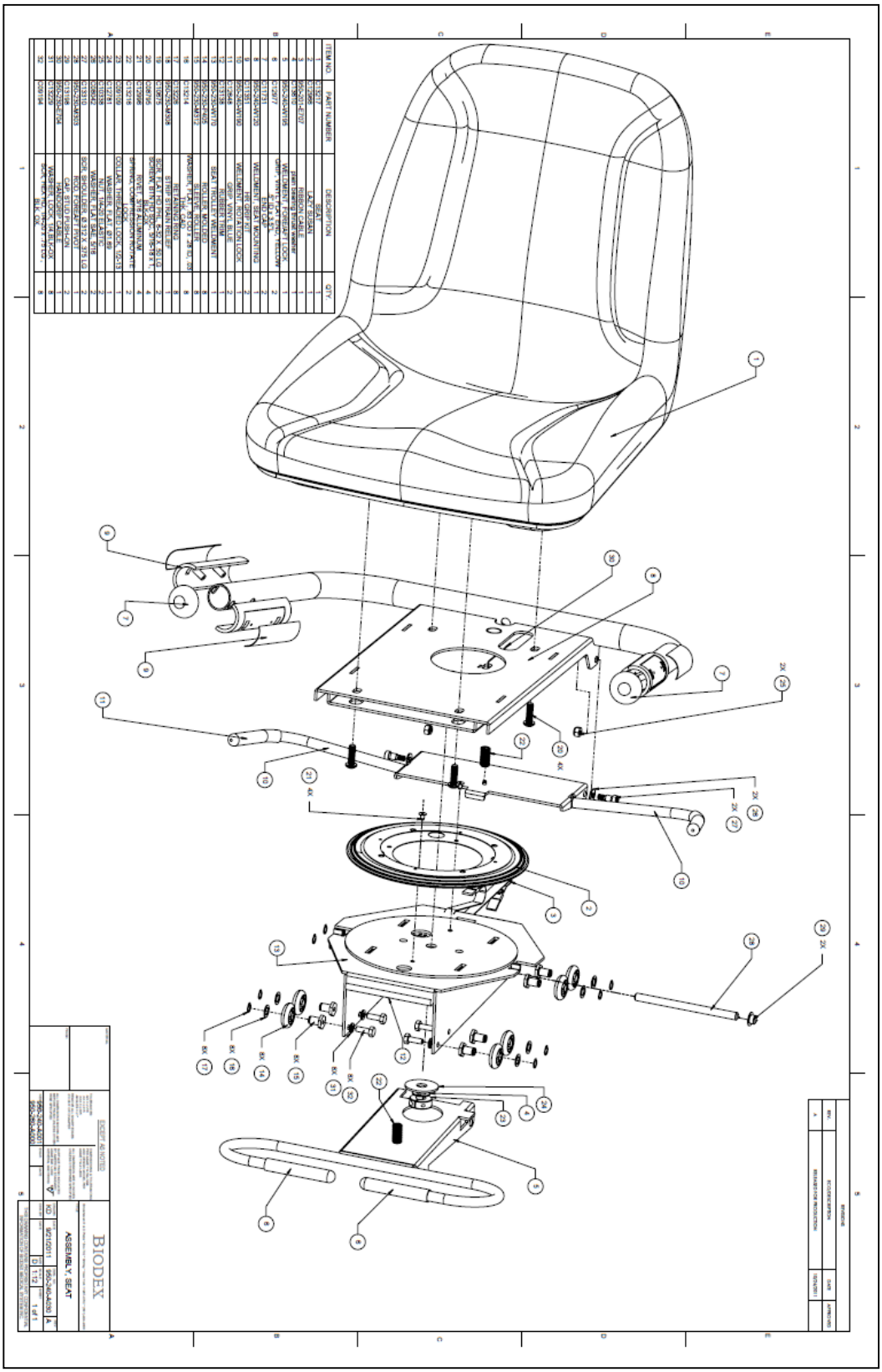
950-240-A010, UPPER ARM ASSEMBLY, RIGHT.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	950-240-W130	WELDMENT, UPPER ARM, RIGHT	1
2	C12655	SCREW, BUTTON HEAD CAP 6-32 x0.312 L BLK OX	2
3	C13686	.625"IDx.875"ODx .625" L NEEDLE BEARING	2
4	C08061	4-40 HEX NUT	3
5	C12659	SCREW, PHMS 4-40x.075" LONG	3
6	950-230-P341	SLIDE, CAM LOCK	1
7	950-230-P406	PIVOT GRIP, OVER MOLDED	2
8	950-230-P339	CAM LOCK, STATIONARY	1
9	C09075	SCREW, SOC HD CAP #1/4-20 X 1.00	1
10	950-230-M335	PIN, PIVOT	1
11	950-230-W145	WELDMENT, TELESCOPING ARM	1
12	950-200-L604	LABEL, TELESCOPING ARM	1
13	950-230-L600	LOCK/ UNLOCK LABEL	1
14	950-230-P340	CAM LOCK, ROTARY	1
15	950-230-L602	UPPER ARM LABEL	1
16	C11896	SCR, PHP,#6 x .38,SLF-TAP,TRI-ZP,TYP B	1
17	C11730	SUPER LUBE	A/R
18	950-240-M135	LOWER PIVOT	1
19	C08042	WASHER, FLAT 5/16, TRI-ZP .344"IDx.688"ODx.065w	1
20	C08043	WASHER, LOCK, 5/16, SPLIT, TRI-ZP	1
21	C08637	SCREW, HEX HD, 5/16-18 x .75, ZIP, GR8	1

950-240-A015, UPPER ARM ASSEMBLY, LEFT

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	950-240-W140	WELDMENT, UPPER ARM, LEFT	1
2	C12655	SCREW, BUTTON HEAD CAP 6-32 x0.312 L BLK OX	2
3	C13686	.625"IDx.875"ODx .625" L NEEDLE BEARING	2
4	C08061	4-40 HEX NUT	3
5	C12659	SCREW, PHMS 4-40x.075" LONG	3
6	950-230-P341	SLIDE, CAM LOCK	1
7	950-230-P406	PIVOT GRIP, OVER MOLDED	2
8	950-230-P339	CAM LOCK, STATIONARY	1
9	C09075	SCREW, SOC HD CAP #1/4-20 X 1.00	1
10	950-230-M335	PIN, PIVOT	1
11	950-230-W145	WELDMENT, TELESCOPING ARM	1
12	950-200-L604	LABEL, TELESCOPING ARM	1
13	950-230-L600	LOCK/ UNLOCK LABEL	1
14	950-230-P340	CAM LOCK, ROTARY	1
15	950-230-L602	UPPER ARM LABEL	1
16	C11896	SCR, PHP,#6 x .38,SLF-TAP,TRI-ZP,TYP B	1
17	C11730	SUPER LUBE	A/R
18	950-240-M135	LOWER PIVOT	1
19	C08042	WASHER, FLAT 5/16, TRI-ZP .344"IDx.688"ODx.065w	1
20	C08043	WASHER, LOCK, 5/16, SPLIT, TRI-ZP	1
21	C08637	SCREW, HEX HD, 5/16-18 x .75, ZIP, GR8	1





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