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Focus Designs Inc.  
Self Balancing Unicycle (SBU)

OWNER'S MANUAL  
6<sup>th</sup> Edition, 2014

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# WITHOUT PROPER USE, THE SBU CAN BE DANGEROUS

## READ ME FIRST

### IMPORTANT:

This manual contains important safety, performance and service information. Read it before you take the first ride on your new SBU and keep it for reference.

### A SPECIAL NOTE FOR PARENTS:

As a parent or guardian, you are responsible for the activities and safety of your minor child, and that includes making sure that the SBU is properly fitted to the child; that it is in good repair and safe operating condition; that you and your child have learned and understand the safe operation of the SBU; and that you and your child have learned, understand and obey not only the applicable local motor vehicle, unicycle and traffic laws, but also the common sense rules of safe and responsible unicycling. As a parent, you should read this manual, as well as review its warnings and the SBU's functions and operating procedures with your child, before letting your child ride the SBU.

## FOR YOUR RECORDS

Congratulations on the purchase of your new Focus Designs SBU, you are now an official member of the #N3rdH3rd! This manual is designed to give you the information you need for the safe operation and maintenance of your new SBU. Please read it thoroughly before riding your SBU.

Please take this opportunity to record important information about your new SBU.

**Please visit [focusdesigns.com/user](https://focusdesigns.com/user)**

**REGISTER YOUR SBU**

We cannot guarantee a warranty  
claim unless you do this!

Your SN is located on the rim of the wheel

Your Name \_\_\_\_\_

Date of Purchase \_\_\_\_\_

Location of Purchase \_\_\_\_\_

Serial Number \_\_\_\_\_

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## GENERAL WARNING

Like any sport, unicycling or SBUing involves risk of injury and damage. By choosing to ride the SBU, you assume the responsibility for that risk. You need to understand, and to practice the rules of safe and responsible riding and of proper use and maintenance. Proper use and maintenance of your SBU reduces risk of injury. This Manual contains many “Warnings” and “Cautions” concerning the consequences of failure to maintain or inspect your SBU and of failure to follow safe cycling practices.

The word **WARNING** indicates a potentially hazardous situation, which, if not avoided, could result in serious injury or death.

The word **CAUTION** indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury, or is an alert against unsafe practices.

The word **CAUTION** also indicates a situation, which, if not avoided, could result in serious damage to the SBU or the voiding of your warranty. Many of the Warnings and Cautions say, “You may lose control and fall.” Because any fall can result in serious injury or even death, we do not always repeat the warning of possible injury or death. Because it is impossible to anticipate every situation or condition, which can occur while riding, this Manual makes no representation about the safe use of the SBU under all conditions. There are risks associated with the use of any unicycle which cannot be predicted or avoided, and which are the sole responsibility of the rider.

## FIT

### Does Your SBU Fit You?

Correct fit is an essential element of SBU safety, performance and comfort – it will result in the correct fit for your body. *The SBU is designed for riders with an inseam of at least 26"*, although it is possible for riders of any height to ride the SBU, it will require assistance from another person while learning how to ride the SBU for the first time. The SBU is easy to adjust to fit your body; there is simply one item that addresses fit, the seat height.

**WARNING:** If your SBU does not fit properly, you may lose control and fall. Adjust the SBU for proper fit, have someone assist you during the learning to ride process. We recommend two people, one on either side of you for balance support.

### Seat Adjustments

If you are a beginner, we recommend you set the seat height at a level that allows you to place both feet flat on the ground while straddling the SBU's seat. This is important when learning to balance left and right on the SBU. After you have mastered left right balance, we recommend you raise the seat for a higher level of riding comfort.

The seat is adjusted using the quick-release clamp located on the seat post. Make sure to observe the Minimum Insertion requirements of the seat post. The seat post should be inserted into the SBU frame **AT LEAST TWO INCHES**. Once your seat is at the desired height, tighten the clamp slightly, and align the seat

with the wheel, making sure they are in line with each other, and then tighten so that the seat post does not have movement in any direction.

**WARNING:** Always make sure that your seat post is inserted at least the Minimum Insertion requirement of two inches. If not inserted at least two inches, the seat post may break or separate from the frame which could cause you to lose control and fall.

**WARNING:** After any seat adjustment, be sure that the seat clamp is properly tightened before riding. A loose seat clamp can cause damage to the seat post or cause you to lose control and fall. A correctly tightened seat clamp will allow no seat movement in any direction. Periodically check to make sure that the seat clamp is properly tightened.

## **SAFETY FIRST**

### **Helmet**

**Always wear an approved helmet when riding your SBU.** Be sure to attach the chinstrap, and follow the helmet manufacturer's instructions for fit, use and care of your helmet.

### **Other Safety Gear**

**Also wear other required and recommended safety equipment** such as: elbow pads, kneepads, shin guards and wrist guards.

### **See Appendix A**

for additional Safety Information.

**WARNING:** Many local governments legislate “road worthy” laws and require specific safety devices. It is your responsibility to familiarize yourself with the laws of the location where you ride and to comply with all applicable laws. This includes properly equipping yourself and your SBU as the law requires.

## **MECHANICAL SAFETY CHECK**

Bikers, skiers, and all keen sports people will check their equipment before each use. So, we recommend that you routinely check the condition of your SBU before every ride. Some service and maintenance can and should be performed by the owner, and requires no special tools or knowledge beyond what is presented in this manual. The following are examples of the type of service you should perform yourself.

**WARNING:** Before performing any work on the SBU make sure to disengage the power by switching the safety lock to the “locked” position. This will prevent the SBU from an accidental “power on” condition.

### **Safety Check**

Make sure nothing on your SBU is loose or damaged or shows unusual wear. Check all bolts and nuts to make sure they are tight. With the SBU turned OFF, lift it above the ground two or three inches and while holding the SBU bounce the tire on the ground. This is a check to determine if anything sounds, feels or looks loose. Do a quick visual inspection of the whole SBU. Are there any loose parts or accessories? If so, secure them. If you’re not sure, ask someone with experience to check.

## Frame

Check the frame particularly in the area around welded joints; the seat post and clamp for any deep scratches, cracks or discoloration. These are signs of stress-caused fatigue and indicate that a part is at the end of its useful life and needs to be replaced.

## Tire

Make sure the tire is sufficiently inflated but below the maximum recommended pressure that is printed on the sidewall of the tire. The best way to inflate a tire to the correct pressure is with a bicycle pump, which has a built-in pressure gauge. Check the tire and look for any cuts in the tread and sidewall. Check to make sure the tire bead is seated evenly on the rim. Replace a damaged tire before riding.

**WARNING:** Riding the SBU with a flat or under-inflated tire, will void your warranty.

**WARNING:** Never inflate a tire beyond the maximum pressure marked on the tire's sidewall. Exceeding the recommended maximum pressure may blow the tire off the rim, which could cause damage to the SBU and injury to the rider and bystanders – it will also void your warranty.

**CAUTION:** Pencil type automotive tire gauges can be inaccurate and should not be relied upon for consistent accurate pressure readings. Instead use a quality dial gauge.

## Tube

If the tube is damaged or punctured we recommend replacing the tube, patches should only be used for an

emergency repair and the patched tube should be replaced as soon as possible.

**Tube Replacement:**

Please visit the [focusdesigns.com/user](https://focusdesigns.com/user) website for a video about tube replacement which highlights the following procedure:

- i. Make sure the SBU Safety Lock is in the “off” position.
- ii. Remove the 8 bolts holding the wheel to the frame.
- iii. Remove the tire from the wheel rim using a bicycle tire remover, then remove the damaged tube from within the tire.
- iv. Carefully fit a new tube in the tire; place tire onto the wheel rim making sure the tire bead is seated evenly on the rim.
- v. Inflate the tire to recommended pressure that is printed on the sidewall of the tire.
- vi. Place wheel back onto frame fork, paying attention to the proper orientation and alignment of the wheel and the flats of the shaft.
- vii. Securely fasten the 8 bolts into the frame. Spin the wheel to make sure it is secure, spins freely, and appears uniform (no tire bulges).
- viii. Check to make sure everything is secure, and you are ready to ride again.

**CAUTION:** Riding the SBU while damaged will void your warranty; inspect your SBU before each ride to make sure it is in good running condition. Doing so will prolong the life of your SBU and possibly your own life. Live long and prosper, my friend!

**WARNING:** The SBU is technologically advanced and complex. The only serviceable parts on the SBU are the tire, tube, and seat. All electronic and drive components need to be serviced by Focus Designs Inc. or a Focus Designs Inc authorized service center. Adjustments made to electronic or drive components will void warranty.

**WARNING:** Many service and repair tasks require special knowledge and tools. Do not begin any adjustments or service on your SBU until you have learned how to properly complete them. Improper adjustment or service may result in damage to the SBU or an accident, which can cause serious injury or death.

A qualified mechanic using the correct tools and procedures specified by Focus Designs, Inc should perform all other service, maintenance and repair in a properly equipped facility.

## **OPERATION**

It's important to your safety, performance and enjoyment to understand how things work on your SBU. It is imperative that you to read and understand the operation of your SBU. If you have even the slightest doubt as to whether you understand something in this section of the Manual, contact Focus Designs by email or by telephone.

### **Safety Lock**

The SBU safety lock needs to be in the “on” position in order for the Pushbutton Switch to work. When the

safety lock is in the locked mode, the SBU cannot be activated.

### Pushbutton Switch

The SBU is powered ON and OFF by the pushbutton switch on top of the enclosure. **Always make sure the SBU is firmly on the ground in the upright, ready to ride position, before turning the Pushbutton Switch “ON”.** Once the switch is pressed into the on position, the SBU will self-balance in about 1 second and the status LED will illuminate. **Never leave the SBU switch in the “ON” position when charging or storing.** Do not leave the SBU “ON” while leaned up against a wall.

**WARNING:** The SBU’s electric motor starts automatically when the Pushbutton Switch is depressed. Keep all hands and feet away from the moving parts.

### Charger Port

The SBU must only be charged using the charger provided by Focus Designs. Use of any other charger WILL void your warranty. The Charging Port is located on the opposite side of the top plate from the Safety Lock and Pushbutton Switch.

### LED Status Indicator

The LED on the pushbutton switch is the only status indicator for the SBU. The LED will indicate the modes of the SBU (please refer to LED Blink Codes section).

#### Normal Operation

*In normal operating conditions the LED Status Indicator will pulse slowly. It will gradually turn on then off indicating that it is in normal balancing mode.*



### Low Battery Operation

As the battery gets closer to the end of its capacity during your ride the LED Status Indicator will begin to pulse more “OFF” than it is “ON”.



### LED Blink Codes

There are many different blink codes that may indicate an irregular activity with your SBU. The various factory modes are differentiated by the number of blinks in a row.



## If you fall, count the code!

1 blink	BMS indicating low battery
2 blinks	Voltage too low
3 blinks	Voltage too high
4 blinks	Fall detected
5 blinks	Pick up detected
6 blinks	Over-current detected
7 blinks	Over-temperature
8 blinks	Bad gyro
9 blinks	Bad accelerometer
10 blinks	Bad current sensor
11 blinks	Bad hall sensors
12 blinks	Bad motor

**WARNING:** Do not overpower the balancing capabilities of the SBU by aggressively leaning forward or backward. Loss of control, serious injury or death may occur from ignoring safety warnings.

### Motion Learning Technology

The SBU takes a little bit of time to learn but once you master it you'll find that riding becomes as natural as walking and chewing gum (only way cooler!). We call the advanced firmware that makes riding feel easy and second nature the Focus Designs Motion Learning Technology™. This technology will actively “learn” your motion and perform thousands of calculations every second of your ride to predictably “know” your desired motion and intent.

#### Turn Assist™

When you intend to turn the SBU, it detects your intent and provides additional stability assistance throughout the turn. It's a lot like having a sloped embankment for a racecar driver, only Turn Assist™ help is provided from Focus Designs firmware with additional help from the 3-axis sensors.



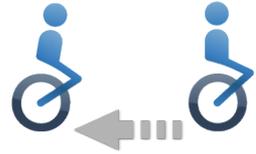
#### Smart Sense™

If the SBU detects a fall, it will cut power to the motor automatically. If this happens, the SBU will remain in fall detection mode disabling the SBU. To power the SBU on again, turn the SBU “OFF” and then “ON” again by using the Pushbutton Switch. This process resets the SBU and makes it ride-able again.



**Push Back™**

If at any time the rider demands too much current from the SBU by any number of factors (by either trying to go too fast, ascending a very steep incline, or operating with a very low battery) the SBU will moderately “push back” the rider. Once this mode is experienced the rider should heed this caution by riding less aggressively, changing ascent angle, or charging battery.



## The SBU has limits. Learn Them!

**Dead Battery Push Back™**

When the battery has reached its discharged status it will perform a much more aggressive Push Back™, called “Dead Battery Push Back™”. When this is experienced, the SBU will become inoperative. You will feel like you have to lean almost completely over the SBU in order to just stay upright. When you feel this mode, **GET OFF!**

**Full Battery Push Back™**

When the battery is fully charged and you continue to charge it via the regenerative braking mode (traveling down a hill), another form of Push Back™ will engage. This “Full Battery Push Back™” mode is aimed to prevent over charging of the battery cells. When pushback occurs down a hill, turn the SBU off and then on again, and simply travel up the hill for a few seconds to expend some of the charge. After a small portion of the charge has been expired, you can continue down the hill on the SBU.

## Batteries

The SBU utilizes the latest technology in high power batteries. This battery is capable of very high power, long life, and is inherently safer than standard battery technology. Although the technology is much safer than standard battery technology, care must be taken to never overcharge, undercharge or damage the battery in any way. The Battery is a split pack and is located beneath the top plate in each side of the SBU.

**The battery should be charged at least every two months!**

**WARNING:** Never overcharge, undercharge or physically damage the Battery Pack. If the Battery Pack appears to be damaged or is not holding a charge, **DO NOT USE IT!**

## Folding Foot Pegs

Your SBU is equipped with Folding Foot Pegs. These Foot Pegs can be folded in order to make the SBU more compact.

## Battery Charger and Charging

Only use the Focus Designs Charger. The high power battery pack must only be charged using the Focus Designs supplied charger. Do not attempt to charge by any other means. The Battery Charger has a special connector that matches the Charging Port of the SBU.

## Charging the Battery

1. Connect Battery Charger to “AC” supply.
2. Connect Battery Charger to SBU Charging Port.  
The Charger will display a “red light”.
  - a. Make sure to align the SBU Charging Port on the Top Plate correctly with the Battery Charger plug. Once the plug is aligned properly it will slide straight in.
3. Please Note:
  - a. Charger will automatically stop charging when Battery Pack is fully charged, denoted by a “green light”.
  - b. Charging time is dependent upon level of battery discharge – charging could take up to one hour.
  - c. Battery Pack will “self-balance”. Leave charger attached for an additional hour to allow the Battery Pack to self-balance. You will know that it is self-balancing because the charger will turn on and off every 5–20 minutes.
  - d. Disconnect Charger after self-balancing is complete. Again, give it an extra hour to be certain. The battery does not self-balance every time.
  - e. **WARNING:** Do not leave charger attached to the SBU charging for extended periods of time. Leaving charger on for an extended period may damage the Battery Pack.

## Battery Shelf Life

Do not let the SBU’s battery sit unused for prolonged periods of time. The battery will need to see a full charge **EVERY TWO MONTHS**. Failure to keep your

battery fully charged every two months may void your warranty.

## **RIDING THE SBU**

### **Make Sure It Fits**

Read the “Fit” section before you ride.

### **Safety Check**

Perform the Mechanical Safety Check before you ride.

### **Be Safe**

Read all safety instructions first.

### **Before You Get On**

Pick a controlled environment, away from cars, people (other than your assistants), obstacles or other hazards. Ride to become familiar with features and performance of your new SBU and to become fully in control.

## **Don't lift the SBU.**

Do not lift the SBU off the ground while it is powered ON. If you do this, the SBU will attempt to balance and spin the wheel at a rapid speed in the air. If the SBU is (accidentally) lifted up while powered on, turn it OFF, wait for the wheel to stop, then place it firmly on the ground and turn it back ON.

Power ON the SBU in the upright (ready to ride) position.

### **SBU Balancing**

Hold the SBU by placing your hand on the seat, push the SBU forward and backward. Notice how the SBU remains balanced under your hand forward and backward.

Straddle the seat. Try walking while straddling the SBU. Notice that the SBU stays underneath you remaining balanced.

Walk forward, the SBU moves forward, walk backward, the SBU moves backward.

### **Don't Hold The Seat**

Do not hold onto the seat while riding the SBU! Trust us on this one! It is impossible to balance left/right while holding the seat. Use your arms for balance, not to hold the seat.

### **Twist to Balance. Don't Lean.**

Twisting does the balancing left and right. Most people think that you lean left or lean right to balance but in fact you must twist. For example, if you feel you are falling to the left, twist your hips and legs (as you squeeze the seat between your legs) so that you turn the SBU into the left direction. You will need your hands on the outside to generate rotational momentum. Try to use very smooth motions and not jerky motions. You will find that small balance adjustments are more effective, and require less exertion.

### **Arms Up and Out. Look Up at the Horizon.**

Just think Leonardo DeCaprio in Titanic: "I'm the king of the world!" Arms up and out, looking straight ahead, not down at the ground or the SBU. And say it

loud: “I’m the king of the world!” And remember: don’t grab the seat.

### **Speed Control**

While sitting on the SBU, put one foot on the peg and the other in front of you hovering above the ground. Lean forward to move forward and then lean back slow down and stop. Perform this exercise until you are comfortable with the SBU’s speed control.

### **Lean to Go**

Lean forward to move forward, lean back to slow down and stop.

### **Recap**

Arms up, look up, no seat grabbing, lean forward to move forward, lean backward to slow down and stop. Make sure you’ve mastered these things before moving on to the next step.

Now you’re ready to put both feet on the Folding Foot Pegs!

### **Hips Don’t Lie**

Hips, just remember it’s all in the hips. To balance left and right, twist your lower body to steer the SBU in the direction you want to go. Shifting weight to steer will not be effective, you must twist your body to steer and balance. The balls of your feet should be on the Folding Foot Pegs so you can also use your ankles to twist the SBU for minor balancing adjustments. Just like when riding a bike, it’s easier to balance with some speed. Remember rotating wheels are gyroscopes providing stability. The faster the rotation, the more stability! But don’t forget to lean back to slow down or stop if you’re going too fast!

### **Twist For Stability**

Do not shift your weight, use your hips, and the hips don't lie.

### **Small Movements**

Use baby steps. First time riders tend to over correct when trying to balance left and right.

### **Turning**

Turning takes a while to master. When you are comfortable try leaning to one side or extend an arm in the direction you wish to turn. With practice, you will develop your own unique turning technique.

### **Practice. Practice. Practice.**

It takes about 20 to 30 minutes to get going forward and stopping, with your feet on the Folding Foot Pegs. It takes about another 2–5 hours to feel fully confident riding and turning. Don't lose heart, keep practicing, you will get it. If you're getting frustrated take at least a 15-minute break and try again – remember that each attempt on the SBU is building muscle memory (and leg muscle strength)!

# **Remember, this is fun!**

## **CHANGING / MODIFYING THE SBU**

There are many components and accessories available to enhance the comfort, performance and appearance of your SBU. However, if you add accessories, you do so at your own risk. Focus Designs Inc has most likely not tested your accessory for compatibility, reliability

or safety with the SBU. Check with Focus Designs Inc before adding any accessories to your SBU.

**WARNING:** Failure to confirm compatibility, properly install, operate or maintain any component or accessory can result in serious injury or death and will void your warranty.

**CAUTION:** Changing or modifying any factory components of your SBU will void your warranty.

## APPENDIX A - SAFETY

Always wear a multi-sport helmet, which meets the latest certification standards and is appropriate for the type of riding you do. Always follow the helmet manufacturer's instructions for fit, use and care of your helmet. Most serious injuries involve head injuries, which might have been avoided if the rider had worn an appropriate helmet.

**WARNING:** Failure to wear a helmet when riding may result in serious injury or death.

- 1) Always perform the Mechanical Safety Check before you get on the SBU.
- 2) Be thoroughly familiar with the controls of your SBU: Pushbutton Switch, Folding Foot Pegs, etc.
- 3) Be very careful to keep body parts, clothing, and other objects away from the spinning wheel of your SBU.
- 4) Always wear:
  - a) Shoes that stay on your feet and will grip the Folding Foot Pegs well. Never ride barefoot, while wearing sandals or flip-flops.
  - b) Bright clothing clearly visible to drivers, riders, and pedestrians that is not so loose that it can be tangled in the SBU or snagged by objects at the side of the road, sidewalk or trail.
  - c) Protective eyewear, to protect against airborne dirt, dust and bugs - tinted when the sun is bright, clear when it's not.
- 5) When riding, always maintain a good situational awareness of all that surrounds you. Monitor traffic, road conditions, debris, other riders and pedestrians.

- 6) Ride at a speed appropriate for conditions. Increased speed equals higher risk.
- 7) Do not ride at night or when visibility is obscured, fog, at dawn, dusk or in the dark.

**CAUTION:** Do not ride the SBU on overly steep inclines or declines. The maximum grade for the SBU is 30%. This may cause the motor and/or battery to overheat. This will void your warranty.

**CAUTION:** Do not attempt to jump or do stunt riding with your SBU. This will void your warranty.

- 8) Observe all local laws and regulations. Observe regulations about licensing, riding on sidewalks, laws regulating path and trail use, and so on. Observe helmet laws and special traffic laws. It's your responsibility to know and obey the laws in your riding area.
- 9) You are sharing the road or the path with others – motorists, pedestrians and other cyclists. Respect their rights.
- 10) Ride defensively. Always assume others do not see you.
- 11) Look ahead, and be ready to avoid or yield to:
  - a) Vehicles slowing or turning, entering the road or your lane ahead of you, or coming up behind you.
  - b) Parked cars or car doors opening.
  - c) Pedestrians stepping out.
  - d) Children or pets playing near the road.
  - e) Pot holes, sewer grating, railroad tracks, expansion joints, road or sidewalk construction, debris and other obstructions that could cause you to swerve into traffic,

catch your wheel or otherwise cause you to lose control and have an accident.

- f) There are many other hazards and distractions which can occur on an SBU ride. So use good judgment!

- 12) Ride in designated lanes or designated paths or as close to the edge of the road as possible, in the direction of traffic flow or as directed by local governing laws.
- 13) Stop at stop signs and traffic lights; slow down and look both ways at street intersections. Remember that an SBU always loses in a collision with a motor vehicle; so be prepared to yield even if you have the right of way.
- 14) Use approved hand signals for turning and stopping.
- 15) Never carry a passenger.
- 16) Never carry anything which obstructs your vision or your complete control of the SBU or which could cause you or your clothing to become entangled in the moving parts of the SBU.
- 17) Never hitch a ride holding on to another moving vehicle or object.
- 18) Don't weave through traffic or make any moves that may surprise people with whom you are sharing the road.
- 19) Observe and yield the right of way.
- 20) Never ride your SBU while under the influence of alcohol or drugs.
- 21) Do not ride in bad weather, when visibility is obscured, at dawn, dusk or in the dark, or when extremely tired. Each of these conditions increases the risk of an accident.

- 22) Do not ride the SBU off road, only ride on smooth stable paths, such as concrete and asphalt.
- 23) Don't ride alone in remote areas. Even when riding with others, make sure that someone knows where you're going and when you expect to be back.
- 24) Learn to obey the local laws regulating where and how you can ride.
- 25) Yield right of way to pedestrians and animals. Ride in a way that does not frighten or endanger them, and stay far enough away so that their unexpected moves don't endanger you. Play dead if approached by a large animal!

**WARNING:** This Manual contains important safety information. For your child's safety, please review, in detail, this information with your child and make sure that your child understands all warnings, cautions, instructions and safety topics. We recommend that you periodically review and reinforce the information in this Manual with younger riders.

**WARNING:** Failure to follow any of these rules may result in serious injury or death.

## APPENDIX B - SPECIFICATIONS

### Rigid Construction

The SBU V3 is precision crafted by hand with 6061 alloy. Built to last and to stay pretty, the SBU is ultra-portable and is capable of 325-lb loads!

### Truly Hands-Free

No handlebars, no steering wheel, no need for any of that! Control your SBU with natural motions to experience a new way of travel. Lean forward to go, lean back to slow down/stop.



### Elegant Electronics

Among the SBU's many accolades are its superior motor-driving capabilities. Our Pure Sine Wave controller is more advanced than anything on the market. With regenerative braking, unmatched efficiency, eerie silence, and torque-control at the granular level, this BLDC controller is the only one in its class.



### Motion Learning Technology

The SBU takes a little bit of time to learn but once you master it you'll find that riding becomes as natural as walking and chewing gum (only way cooler!). We call the advanced firmware that makes riding feel easy and second nature the Focus Designs Motion Learning Technology™. This technology will actively "learn" your

motion and perform thousands of calculations every second of your ride to predictably “know” your desired motion and intent.

#### Turn Assist™

When you intend to turn the SBU, it detects your intent and provides additional stability assistance throughout the turn. It's a lot like having a sloped embankment for a racecar driver, only Turn Assist™ help is provided from Focus Designs firmware with additional help from the 3-axis sensors.



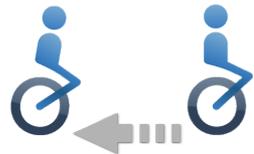
#### Smart Sense™

If the SBU detects a fall, it will cut power to the motor automatically. If this happens, the SBU will remain in fall detection mode disabling the SBU. To power the SBU on again, turn the SBU “OFF” and then “ON” again by using the Pushbutton Switch. This process resets the SBU and makes it ride-able again.



#### Push Back™

If at any time the rider demands too much current from the SBU by any number of factors (by either trying to go too fast, ascending a very steep incline, or operating with a very low battery) the SBU will moderately “push back” the rider. Once this mode is experienced the rider should heed this caution by riding less aggressively, changing ascent angle, or charging battery.



## High-Performance Vehicle

It may weigh only 27lbs but the SBU certainly is not shy to perform. The 1000 Watt BLDC motor commands unparalleled torque and unmatched satisfaction.

### Hill Climbing

30% Grade

### Weight Limit

325 lbs. (145 kg)

### Top Speed

12.5 Mph (20kph)

### Range

Up to 10 miles (16km)

## Regenerative Braking

The SBU incorporates regenerative braking technology to more-efficiently utilize energy. As you lean backwards to slow down, the SBU turns the motor into a generator, capturing your kinetic energy and putting chemical energy back into the battery for later use. This increases overall efficiency.



## Charger

- Output: 58.4V, 2A
- Input: 100–240V, 50–60Hz, International
- Connector: Country-specific cord provided

## Battery



- Split-pack + BMS (16-cell total)
- 53V / 2.5Ah / 133Wh (each ½ pack is 67Wh) / 16g ELC (each ½ pack has 8g ELC). Lithium iron phosphate:  $\text{LiFePO}_4$
- Rechargeable via provided charger.
- Battery shelf time: 2 months.

## The Human Interface

Specifically designed to be intuitive and natural feeling to ride, the hardware interface to the rider is also designed for simplicity and elegance. There is only one button to activate the SBU, a safety lock, and a charger port.



**Adjustable Seat Post**

- 300mm
- Comfortably fits riders 5'1" (155cm) to 6'7" (201cm)
- The SBU also comes with a smaller 200mm seat post for smaller riders. (Standard 1" diameter seat post)

**Dimensions and Travel Specs:**

	Riding Mode	Compact Mode	Storage Mode
			
	15.9" (403mm)	7.5" (192mm)	18" (457mm)
Height	28in. (711.2mm)	28in. (711.2mm)	22.5in. (571mm)
Width	15.9in. (403mm)	7.5in. (192mm)	7.5in. (192mm)
Depth	18in. (457.2mm)	18in. (457.2mm)	16in. (406.4mm) <i>deflated tire</i>

## APPENDIX C - TROUBLESHOOTING

Occasionally you may run into some issues. Before you give us a call please refer to this guide. If you cannot solve the problem please call us at +1 (360) 329-2537 or email us at [info@focusdesigns.com](mailto:info@focusdesigns.com).

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
SBU will not turn on, no LED light or blinks.	Locked	Unlock key
	Extremely depleted battery	Charge SBU, charger may be able to recover the SBU.
	Blown fuse	Check/replace fuse
SBU turns on (blinks) but does not balance	Error code (See “LED Blink Codes” section)	Count the blinks
SBU vibrates when trying to balance	Motor shaft is loose	Tighten lower frame bolts
Lower range than expected	Heavy payload or poor riding conditions	A heavier rider may get significantly less range depending on hills and riding conditions

PROBLEM	POSSIBLE CAUSE	SOLUTIONS
Lower range than expected	Damaged battery	SBU may have been left on or not charged in many months. Contact authorized service provider.
Push Back™ going down hill	The battery is full.	If you have a full charge and are going down a hill the regenerative braking feature may cause an over-voltage in the SBU Battery. If you experience this stop riding.
SBU ride is bumpy	There may be a bulge in the tire	Deflate the tire and re-inflate it carefully. Check to be certain there are no bulges.

## APPENDIX D - WARRANTY

This agreement outlines the WARRANTY coverage supplied by Focus Designs, Inc., hereinafter to be called the “COMPANY” to the “USER” which is defined as an individual who has purchased the SBU (hereinafter to be called the “PRODUCT”) in a retail establishment or via an online storefront as approved by the COMPANY or a COMPANY–authorized service representative.

The COMPANY warrants that the PRODUCT will be free from defects in materials and workmanship for a period of 12 months. If the PRODUCT proves defective AND a claim is filed during the warranty period, the COMPANY, at its option, will:

1. Repair the PRODUCT by means of telephone support, email support, or by providing service at no charge for parts or labor,
2. replace the PRODUCT with a comparable PRODUCT which may be new or refurbished, or,
3. refund the original amount paid for the PRODUCT, less a reasonable allowance for usage, upon its return.

The COMPANY recommends the USER first utilize support materials shipped with the PRODUCT, PRODUCT diagnostics, information contained on the Internet, and email support. If unsuccessful, to obtain service under this WARRANTY the USER must notify the COMPANY or its authorized service representative of the defect BEFORE the expiration of the warranty period.

The USER will provide appropriate assistance to Telephone Support or Email Support personnel to resolve issues. If support is unsuccessful, the COMPANY or its authorized service representative will instruct the USER on how to receive warranty repair.

The COMPANY reserves the right to charge for services in exceptional cases.

If the USER's PRODUCT contains features that enable the COMPANY or its authorized service representatives to diagnose and repair the problems with the PRODUCT remotely, the COMPANY may request that the USER allow such remote access to the PRODUCT.

In the maintenance of the PRODUCT, the COMPANY may use new or equivalent parts, assemblies, or products for equal or improved quality. All defective parts, assemblies, and PRODUCTS become the property of the COMPANY. The COMPANY may require the return of parts, assemblies and PRODUCT to a designated COMPANY depot or to the COMPANY representative from which the part, assembly, or PRODUCT was originally purchased. Return and claims will be handled according to the COMPANY procedure. USER shall be responsible for shipping the PRODUCT to the COMPANY or COMPANY-authorized service representative. COMPANY or COMPANY-authorized representative shall handle warranty shipping back to the USER if manufacturing defect is found.

These warranties shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. The COMPANY shall not be obligated under this warranty:

- a) to repair damage resulting from attempts by personnel other than the COMPANY or COMPANY–authorized representatives to install, repair or service the PRODUCT unless directed by the COMPANY or a COMPANY–authorized representative,
- b) to repair damage, malfunction, or degradation of performance resulting from improper use or connection to incompatible or non–COMPANY produced equipment,
- c) to repair an item that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the PRODUCT or degrades performance or reliability,
- d) to perform user maintenance or cleaning or to repair damage, malfunction, or degradation of performance resulting from failure to perform user maintenance and cleaning as prescribed in published PRODUCT materials,
- e) to repair damage, malfunction, or degradation of performance resulting from use of the PRODUCT in an environment not meeting the operating specifications set forth in the user manual,
- f) to repair damage, malfunction, or degradation of performance resulting from failure to properly prepare and transport the PRODUCT as prescribed in published product materials
- g) to replace items that have been abused, misused, or tampered with in any way;
- h) to install replacement items that are considered USER replaceable (ie. tube, tire, seat, seat post, seat post clamps, nuts, bolts, screws)
- i) to provide software or firmware updates or upgrades.

Any service identified in the above list and provided by the COMPANY at the USER's request shall be invoiced to USER by the COMPANY or COMPANY-authorized service with current rates for parts, labor and travel.

The warranty and the remainder of the coverage time period shall be transferrable to any individual person who is in legal possession of the PRODUCT from the original USER. Proof of purchase, date of purchase from original USER, and documentation proving that the PRODUCT was purchased in working condition must be provided along with any warranty claims. If the aforementioned items cannot be provided along with the warranty claim then the COMPANY, on a good-will basis, will consider the case and the COMPANY shall not be liable for covering the warranty.

THE ABOVE WARRANTIES ARE GIVEN BY THE COMPANY WITH RESPECT TO THIS PRODUCT AND ITS RELATED ITEMS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY SIMILAR STANDARD IMPOSED BY APPLICABLE LEGISLATION. THE COMPANY'S RESPONSIBILITY TO REPAIR, REPLACE, OR OFFER A REFUND FOR DEFECTIVE PRODUCTS AND RELATED ITEMS IS THE SOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR BREACH OF THESE WARRANTIES.

Some states, provinces, and countries do not allow the exclusion or limitation of incidental or consequential damages or exclusions or limitations on the duration of implied warranties or conditions, so the above limitations or exclusions may not apply to you. This

warranty gives you specific legal rights, and you may also have other rights that vary by state, province, or country.

## GLOSSARY OF TERMS

BLDC Motor	Brushless Direct Current Motor. This is the maintenance-free style of motor that Focus Designs uses for the SBU.
BMS	Battery Management System. This is the small rectangular device attached to the battery. It monitors all 16 battery cells for anomalous behavior.
Gimpy	The first prototype of the SBU was actually a miniature two-wheeled robot that we all called “Gimpy”. If you stop by our office we’ll show you Gimpy.
N3RD H3RD	We lovingly call all SBU riders a member of the N3RD H3RD. We use 3’s because let’s face it... we’re all L337 here. 😊
Noob Wheels	We call the “training wheels” the Noob Wheels because that’s the only reason you should be using them... because you’re a n00b (newbie) at the SBU!
SBU	Self Balancing Unicycle. What, do you have a better name?!