Installation Manual
Kawasaki 1700
Version 1

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Introduction

This manual covers installation of the LegUp LandinGear system by Chopper Design Services. This system should only be installed by a qualified technician, or those with above average mechanical skills. If you are not SURE that you can perform this installation, please contact us and we will help you find a qualified shop to assist you.

If you have been looking for a system that will keep your feet on the pegs, this is NOT the system for you! On the other hand, if a system that will relieve you of the weight of the bike and help you avoid balance problems as you approach a stop, LegUp is what you need.

Improper installation will void your warranty, so please be very careful!

Thanks for choosing LegUp!

Warranty

Chopper Design Services warrants the LegUp system for a period of one year from date of purchase. This warranty covers replacement parts and/or manufacturer defects. Incidental damages or costs are the responsibility of the purchaser.

Defective parts are to be returned to Chopper Design at the address below. Purchaser must contact Chopper Design to receive a Return Material Authorization, prior to returning defective parts to Chopper Design.

Abuse, improper installation or use, collisions or accidents, are not covered under this warranty. Replacement parts for this type of damage are available through Chopper Design.

Users of the LegUp system agree that Chopper Design is NOT responsible for personal injuries or damage to property arising from the use of the system. While we believe this system to be safe and reliable, the user is advised that use of LegUp is done so at the users' own risk. Use of the system implies agreement to the above statements. If you can't agree with the above, Chopper Design and its dealers would be happy to refund your full purchase price, before you use the LegUp System.

Chopper Design Services
1365 Bennett Dr #101
Longwood, FL 32750

407-834-5007
LegUp@LandinGear.com

Installation Instructions

The LegUp® system has many components. Pleased be sure you have them all before starting your installation.

COMPONENTS:

1) **Control Switch Box**

2) **Linear Actuator**

3) **On-board Computer Module**

4) **Proximity Sensor**

5) **Leg Support Stand**

6) **Leg/Wheel System**

7) **Hardware Bag**

8) **Actuator Bracket**

If you believe you are missing any parts, please contact Chopper Design at 407-834-5007, and we will rectify the situation.

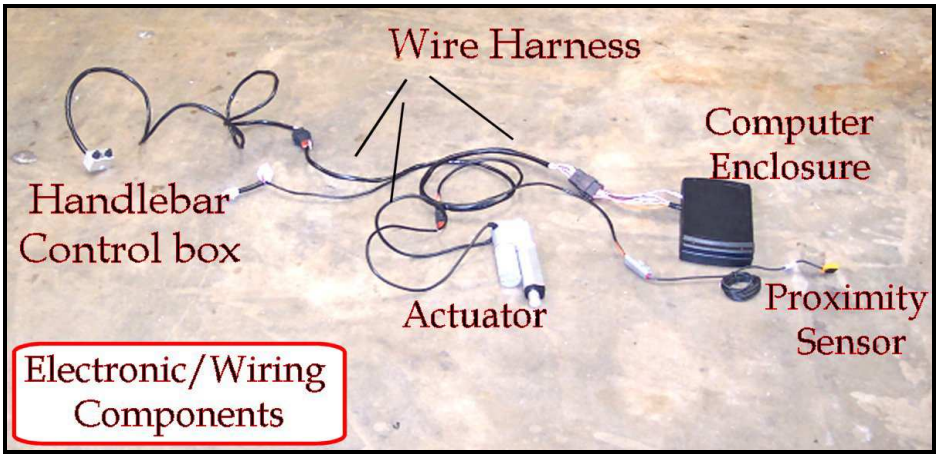


Figure 1

PREPARE FOR INSTALLATION

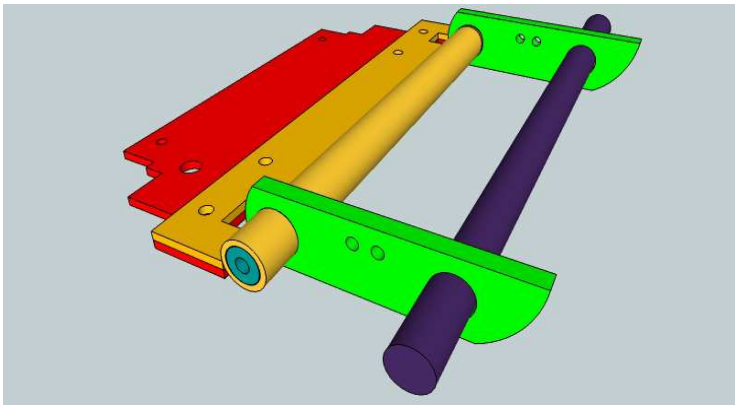
Place the motorcycle on an acceptable bike lift. You will need to keep the bike on its wheels for most of the installation, and jack the rear wheel off the lift for some portion of the installation. Make SURE the motorcycle is secure on the lift!

In preparation for the installation, please remove the left Saddlebag the seat. You also must change the exhaust to a 2 into one exhaust system like the Vance and Hines Pro Pipe shown at left.

Other pipes may work, but Chopper Design cannot guarantee their fitment. We designed the System around this pipe.

We are now ready to begin!

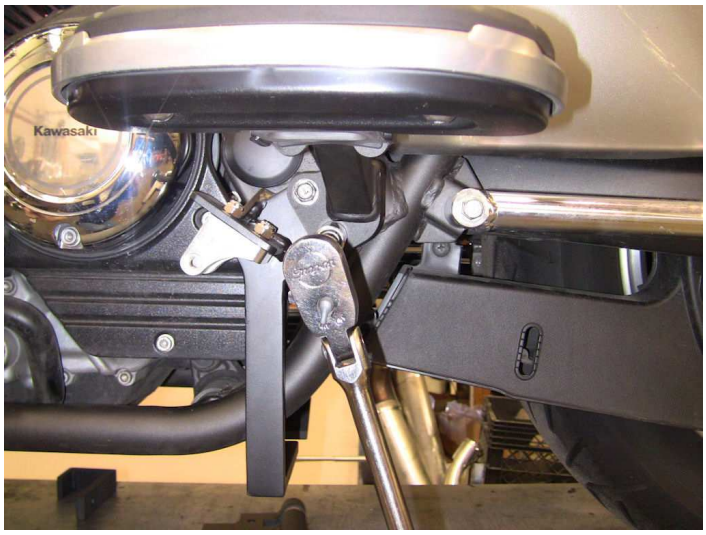
INSTALL LEG SUPPORT STAND



LegUp has developed a new, stronger attachment system which holds the LegUp system to the bike! The plate will mount under the bike.

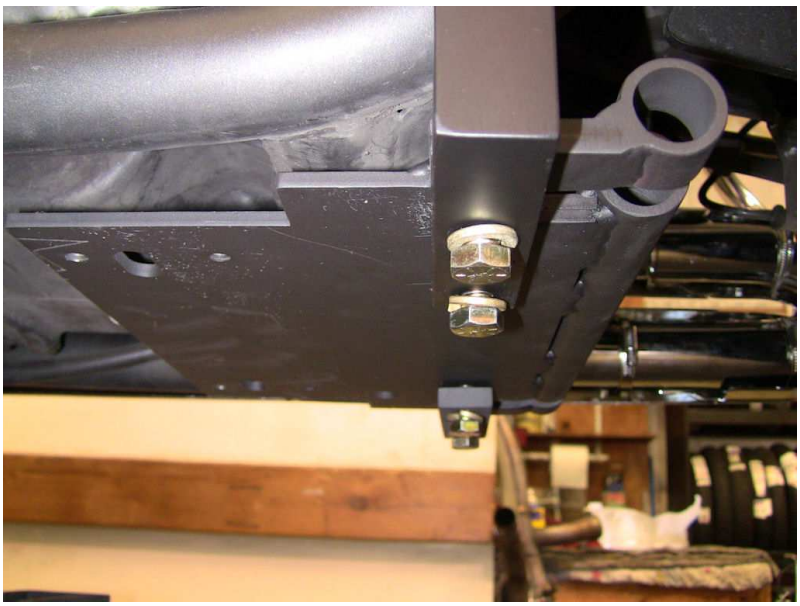
If inserted into the stand, the long stainless steel shaft with the small bolts in the end should have one of the bolts removed, and be slid out of the pipe in the stand. Just set this aside for now.

Remove the two bolts that hold the left passenger floorboard to the bike. Then find the left upright. It has the aluminum actuator mount already attached. Line this bracket up with the holes from the floorboard. Reinsert the bolts through the floorboard, then the bracket and back into the frame of the bike. Blue Loctite is advised on these and all other bolts during the install. Keep the bolts slightly loose for now.



Next find the right upright; a 90 degree bracket with two holes on the long side and a single hole on the short side. Using the supplied M8 Hex bolt, run the bolt through the single hole in the bracket, and thread it into the threaded hole on the right side of the frame as seen here. Again, leave the bolt a bit loose to make the next steps easier!

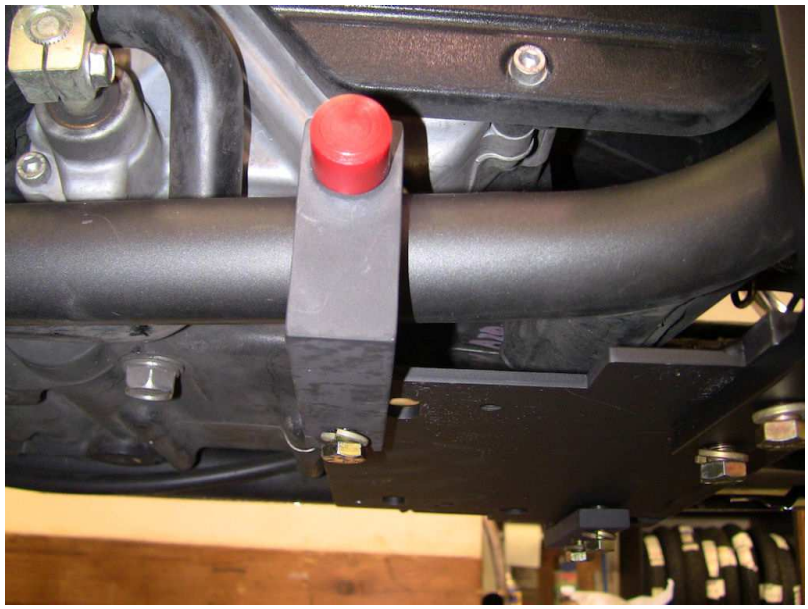
The Support Plate is next…..



The support plate has a pipe on the end. Slide this plate from the back over the two brackets you just installed as seen at left. Make sure the pipe is facing up (again see the picture for reference).

Find four 3/8” bolts with lock washers and start them through the holes in the brackets and thread them into the plate. Get all four started, but again, leave them loose (and don’t forget the Loctite!).

We now want to install the forward mounts. You should find 2 ‘L’ shaped pieces of steel. One has a funny red piece of rubber on it and the other doesn’t. The one with the bumper mounts on the left (kickstand) side of the bike. Slide the bracket over the frame and line the hole up with the threaded hole on the front of the plate you just installed.



Using a 5/16” bolt with a lock washer, start the bolt through the ‘L’ bracket, and thread it into the plate. Leave the bolt loose.

Repeat this on the right side of the bike with the bracket without the bumper.

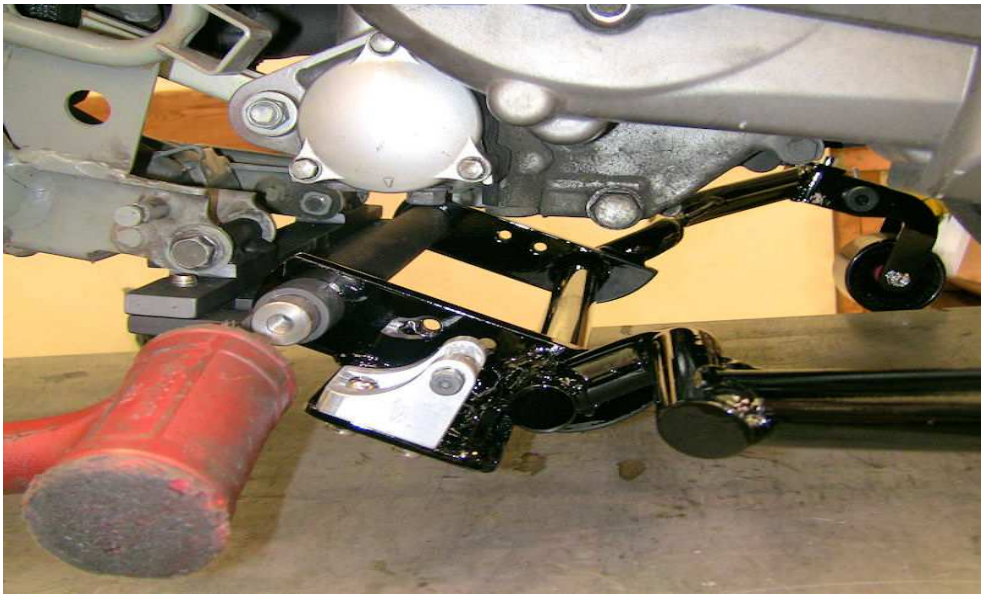
Now we can start tightening all the bolts we have installed. Start with the bolts in the left floorboard, then the single bolt on the right upright. Next tighten all four big bolts under the plate, then the ‘L’ bracket bolts.

Try to keep the L-brackets square to the bike if you can.

Next we mount the Leg/Wheel Assembly!

LEG/WHEEL ASSEMBLY

If not completed already, first remove the bolts from the stainless steel rod in preparation for mounting the legs. With help from an assistant, slide the Leg/Wheel Assembly around the rear tire (careful of the finish!), and align the Leg Mounting Points (Vertical Flat steel with Bushings) with the slots in the Support Stand. If available a very small amount of 'Never Seize' on the shaft is in order here. Then start the stainless steel shaft in from one side through the tube on the support stand, and through the first leg mounting point and its bushing. The fit is tight, so take your time. Carefully work the shaft through the tube and the second leg mounting point. The shaft is inserted properly when it is inserted just past (approximately 1/8") the end of the tube. This distance should be about the same on both sides, but it is not critical as long as both sides are inside the tube. If you need to, you can tap lightly on the shaft (brass drift is preferred here). Once the shaft is in place, use a small amount of blue thread locker and install the (2) chrome bolts and washers on the end of the shaft to finish it off.



Make sure the legs move up and down without any binding!

MOUNT ACTUATOR

Remove the axles from both the upper and lower actuator mounts (aluminum blocks - one on the legs and one on the upper actuator mount), and set them aside. Align the actuator, motor side (big end) down as shown, with the hole in the upper actuator mount. Reinstall the axle bolt on the upper actuator mount first. Use just a touch of thread locker on the threads.

With someone supporting the wheel assembly, raise the legs until the bottom hole in the actuator is lined up with the lower actuator mount. The bottom gets a ¼-20 Chrome bolt with Nylock nut, rather than the Allen bolt you used on the top.

Install this bolt, into the mount, through the actuator, and into the other side of the mount (Some wiggling may be required!). Start the lock nut on but don't tighten it until you are sure everything is perfect.

NOTE: If the actuator is too short to reach the other mount you may have to lengthen it using the system. Temporarily plug the wiring harness into the bike, and follow the direction for 'Maintenance Mode' in the 'Initial System Test' section below. Using what would be the left button on the switch box, just add a small amount of length to the actuator so you can align the mounts, then turn the bike back off.

At this point you need to make sure that the mounts are in alignment and the actuator is not in any sort of bind!

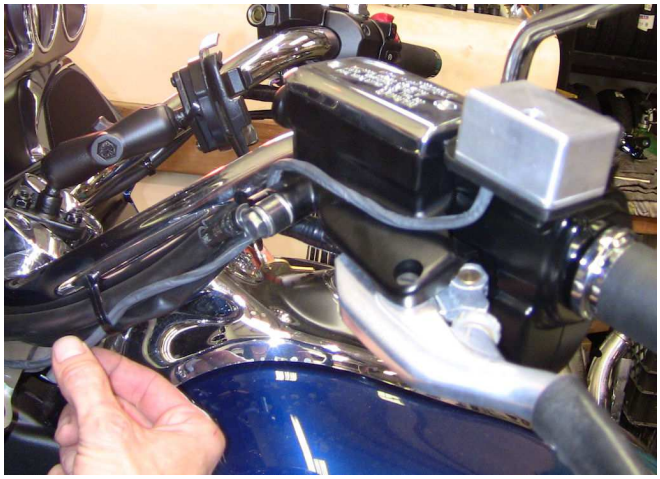
The mounts should be tightened at the factory. If need be readjust the actuator mounts in whatever position is the best with the actuator in its mounts. If needed, mark the mounts with a Sharpie, remove the actuator, tighten the mounts and reinstall the actuator. Make sure the axles slide in easily and there is no bind at all. **MAKE SURE** there is no bind or the actuator will fail prematurely!

CONTROL SWITCH BOX

Disassemble the 8-pin connector attached to the switch housing. The switch wires will run inside down the handlebar and ultimately under the tank to the area under the seat.

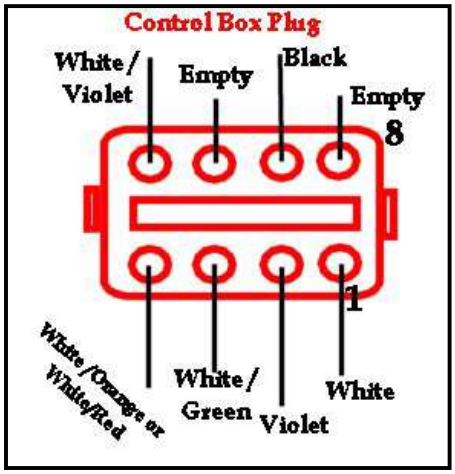
You will need to remove the two Phillips head screws that hold the chrome plate to the left of the master cylinder. The plate is then pried off the mount.

The switch box is installed using the same two screws in the same holes. Mount this plate, and then we can run the wires.



Run the wires down the back of the handlebar along with the other wires, in front of the triple tree, then under the tank.

We tape the wires together to make this easier. As you can see below, the wire will appear in the area under the seat. Use the Diagram below to re-assemble the plug carefully! The wires MUST be correct or it may damage the computer.



WIRING HARNESS

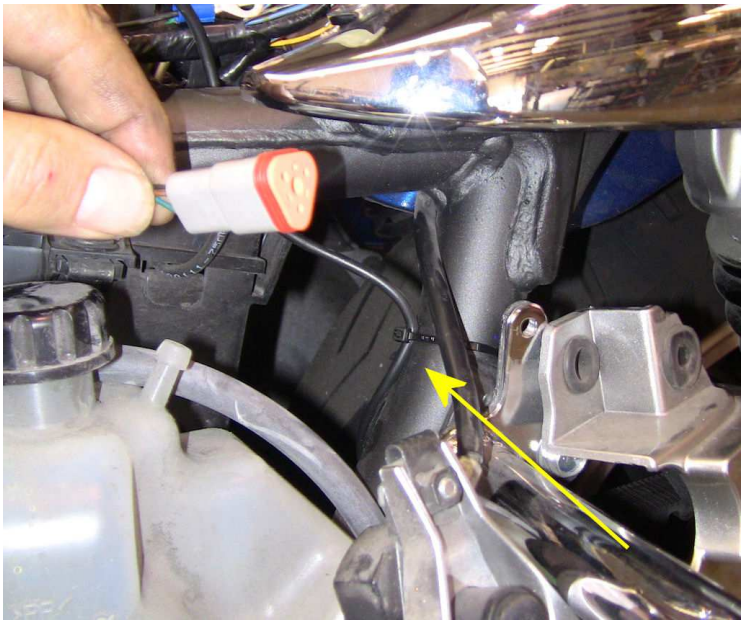
NOTE: If you have a LITE System, Please refer to the addendum at the end of this manual, for differences between a Regular and LITE Harness!

The next step is to route the wiring harness. You can take the rest of the wiring harness and drop it where the seat would go. We already ran the wires from the handlebar switch, so that plug should be under the seat. We need to get the actuator wire (6 pin) and the proximity sensor wire (3 pin), under the seat as well.

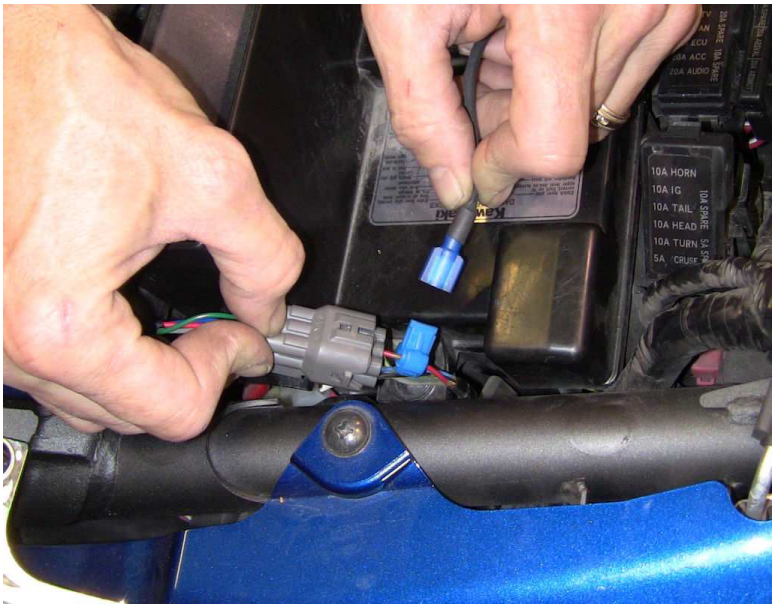
Remove most of the left side cover so we can run some of these wires under there. The actuator wire should have a wire tie holding it to the body of the actuator. Run the plug under the side cover area as seen at left. Don't tie it off yet (we need to leave slack for motion), but lay the plug under the seat.

The Proximity plug needs to get to the same spot. The bracket for the Proximity Sensor (yellow rectangle with an LED) mount to the lower shock bolt (not yet!) so the wire will be tied to the swing arm and up through the side cover area as well.

Here we show the plug under the seat and have a temporary wire tie on the frame so the wire can run down to the left back axle area for mounting later!



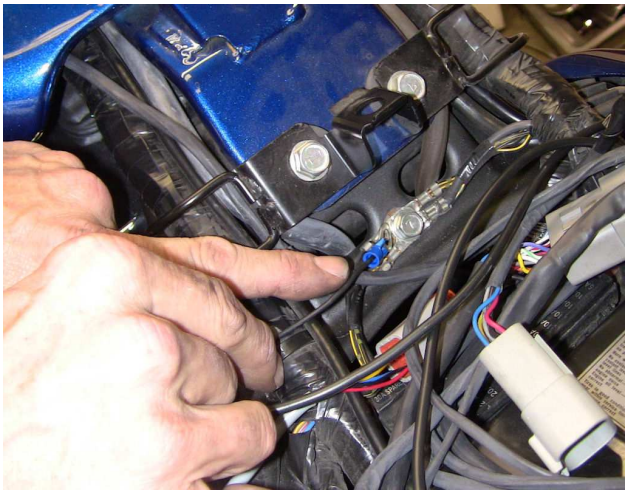
Now we have to get power for the system!



The system draws very little amperage; we decided to use the running light circuit, which is a red wire with gray traces on the grey plug you see here. We don't care where you get your 12 Volt source as long as it is switched and stays on while the bike is running.

Find this wire (we had to strip back some tape) and attach the blue locking connector to it. The blue spade from the wire harness will mate to this plug as shown above.

We next need to ground the system. Find the hoop connector on the black wire and run it toward the front of the under seat area. You will find a number of grounds under a bolt there. Remove the bolt, place the hoop on the bolt and re-insert the bolt into the threaded hole.



We chose to change the fuse on the circuit we are using for power just in case we added to much to the circuit to cause a fuse to blow. The wires can certainly handle five more amps of power, so we removed the 10Amp fuse (third on from the middle on right side fuse box), and replaced it with a 15Amp. The picture below shows the fuse in question removed for clarity.

Now take the harness and find the 12-place plug. This plugs into the Computer. Assuming all the connectors are in front of the seat, find each plugs mate, they only plug in one way, and plug them together.

Let's test the system!

INITIAL SYSTEM TEST

NOTE: If you have a LITE System, Please refer to the addendum at the end of this manual, for differences between a Regular and LITE system. Skip this section if you have a LITE System.

Turn your key switch on. At this point, have a look at the yellow proximity sensor (it should be dangling near the rear axle somewhere. The **RED LED** (ON The Sensor) ***Should Not Be Lit***. Take a metal object (screwdriver, wrench, etc.) and hold it on the flat face of the sensor (it has a circle embossed in it). The LED should light up, and go out when you move the metal away. If not, check all your connections.

Next, press the rightmost pushbutton and hold it for at least 3 seconds. One or both LEDs on the switch panel should light up; we really don't care which at this point. If this occurs, you are doing well. If both LEDs are flashing (maintenance mode) you can skip the next step which is to press both buttons until both LEDs flash.

Next press both buttons for just an instant! If everything is working, the bottom or yellow LED on the switch box should flash, and the top LED should be out. The next step, and be careful here, is to touch the left button for a split second. The legs should move down just a bit. Touch the right button, and they should move up. With the bike on the lift, ***you have to be very careful here!***

If all of the above has occurred, raise the legs. Press and hold the right button until it stops, and turn the ignition switch off!

The test is now complete. Let's move on to mounting the Proximity Sensor.

MOUNT PROXIMITY SWITCH

NOTE: If you have a LITE System, Please refer to the addendum at the end of this manual, for differences between a Regular and LITE system. Skip this section if you have a LITE System.

This step is crucial!!
Understand it before starting. The proximity sensor tells the system how fast the bike is traveling. The proximity sensor mounts to the lower left shock bolt. The sensor will ultimately be mounted 5MM from the pulley bolts.

Remove the cap nut and lock washer from the left rear shock. The proximity bracket with sensor should be in the area of the shock already.

Slide the bracket on the shock bolt and reinstall the lock washer and cap nut with a bit of Loctite. Do Not tighten completely yet. The bracket must be rotated to the proper position for it to work properly. Notice the orientation in the picture here; we want the bolt to cross over the middle of the leftmost area of the face of the sensor.

It would be very helpful if you can jack the rear wheel off the ground or lift for this operation. The idea here is to have the yellow proximity bracket line up with the pulley bolts and be placed no more than 5MM away from them as they rotate! The picture shows the bracket perfectly aligned and also shows how we tied the wire to the bracket, before routing it up the swing arm to get under the seat.

Turn the ignition switch to the on position. The LED may or may not be on. What we are looking for here is for the LED to light as a pulley bolt passes close to the sensor and to go out as the bolt passes by. Have someone watch the LED as you roll the wheel, or the bike, back and forth making the bolts pass close to the sensor.

Once you feel you have the right place, tighten the cap nut down securely, and test again!

If this is not happening, you may need to get the sensor a bit closer to the bolts (5MM is a very small distance!). If you have to move the sensor closer, you may have to bend or adjust the angle of the bracket.

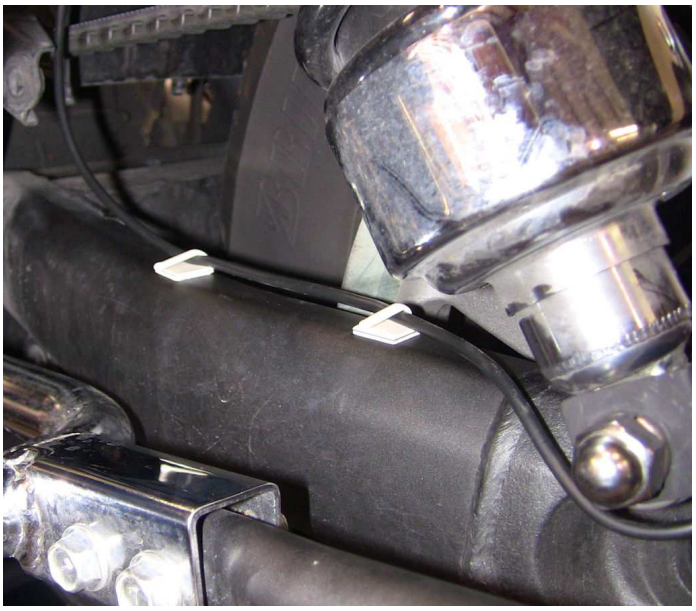
No matter what you need to do, you MUST make sure that as the wheel turns, the light works as described above! The automatic retraction of the legs as well as their deployment RELIES on this sensor being placed perfectly!

Once satisfied with the mount, skip down to the wire routing instructions below.

WIRE ROUTING

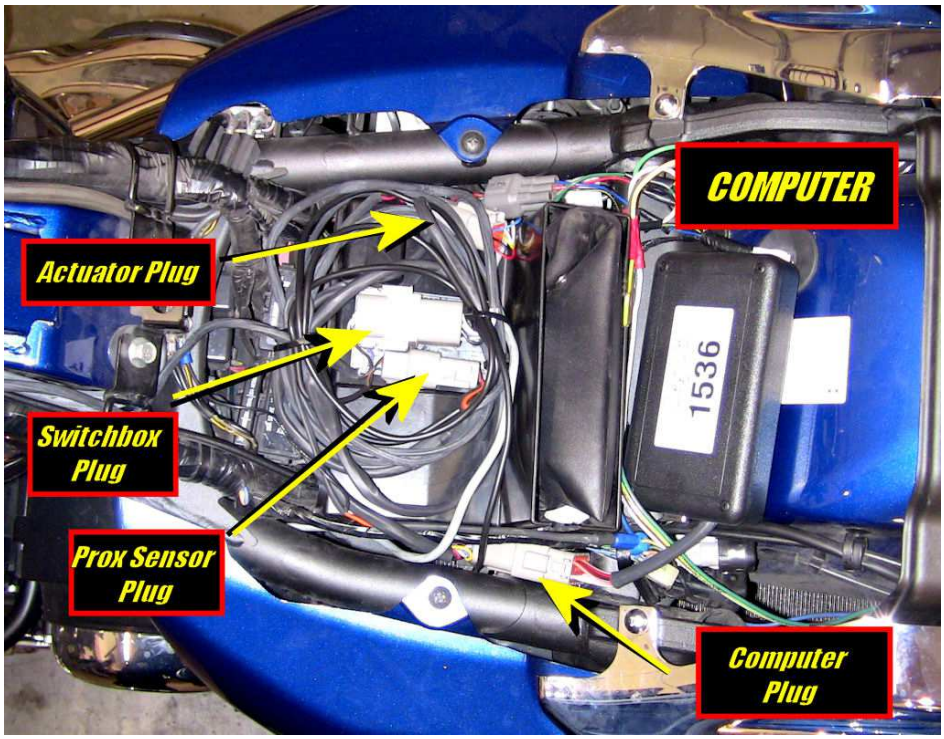
NOTE: If you have a LITE System, Please refer to the addendum at the end of this manual, for differences between a Regular and LITE system. The Proximity sensor is NOT part of the LITE system!

Guide the wires from the Proximity bracket up the swing arm, and route it under the seat. Secure all wires (we used self-adhesive holders shown here), as you don't want the belt or any moving parts interfering with your work! Take whatever extra slack from the wire you can and pull it under the seat. We will be neatening everything very soon.



With help, support the bike and turn on the LegUp system (see owner's manual). It should start in maintenance mode, but if it doesn't, please enter maintenance mode (again in the manual). Now carefully, lower and raise the legs and make sure the wires are not binding and that they clear everything! Raise the legs most of the way and turn off the bike. Now we are ready to button everything up.

Use wire ties to make sure that all wires will stay where you put them and that they will not come in contact with anything that moves. Loop any excess as shown here. Keep the excess wire clean and make sure the seat goes on and off without hitting any wires. If you keep all plugs inside the frame rails as shown, the seat will fit fine. It may take a few tries!



FINISHING UP

Now it is time to recheck everything! Check that all bolts that were loosened are tight. Test that the kickstand contacts the red rubber bumper we installed. Make sure all your wires are routed neatly, tied off nicely and don't interfere with the seat installation.

Now you can dial in the actuator, and adjust the wheels.

ACTUATOR ADJUSTMENT (Maintenance Mode)

NOTE: If you have a LITE System, Please refer to the addendum at the end of this manual, for differences between a Regular and LITE system. Skip this section if you have a LITE System.

Once you have the bike on the ground, turn the ignition on and start the LegUp System (hold right button for 3 seconds). The system should enter maintenance mode automatically (Both LEDs Flash), but if it does not, enter maintenance mode manually (Both buttons for 3 seconds). With a helper nearby, straddle the bike, and hold it level. Hit both buttons for an instant to get the system in the "DOWN" setting mode (yellow LED flashing). Straddle the bike so your weight is NOT on the seat, hit and hold the left button until the wheels contact the ground and stop. Make sure that the suspension raises a bit as you do this. If not, the legs are not going down far enough, the bottom actuator mount may need to be moved left or right a bit to get the wheels all the way down (Contact LegUp for assistance if you need help with this). Once these wheels are down as described above, try to put both feet on the floorboards. The bike should be reasonably stable and you should be able to lean a bit in both directions without the bike falling over. The DOWN stop is now set!

Hit both buttons for a moment to get into the "UP" stop mode (top LED blinking).

Carefully use the right button to raise the legs. Have your helper let you know as you approach anything that may come in contact with the wheels or the legs. You also need to make sure the system clears pipes, clamps etc. If you can't make the clearance to allow the legs to come up all the way, you can set the up stop just below whatever is interfering (if not, you will likely set up a permanent rattle!) Hit both buttons when complete, and you will be done with these adjustment.

Now press the left button and the legs should lower. Hit it again and the legs should retract. If you are satisfied with these limits, you have successfully installed the LegUp System. Time for a test ride!

TEST RIDE

NOTE: If you have a LITE System, Please refer to the addendum at the end of this manual, for differences between a Regular and LITE system. Deployment and Retraction of the wheels is COMPLETELY MANUAL if you have a LITE System.

Get the bike to a clear paved mostly level area where you can test ride it. Start the bike, turn on the LegUp system and lower the legs. The first test should be done in a straight line. Put the bike in gear and slowly accelerate. You may notice that the bike tends to want to steer a small amount left or right. This is normal unless it is severe. Once underway, the top LED should flash at around 6 MPH, meaning the legs are retracting. You can lean on one wheel or the other as you leave to reduce any darting the system may be giving you.

Assuming the legs are retracted, you should try to deploy the wheels. As you come to a stop, the Green LED should be on. As you slow down (**almost stopped**), the Yellow LED should illuminate at the proper speed. Once it does (sometimes hard to see), hit the left button and put your feet down near the ground. The top LED should flash and you should soon feel the wheels deploying underneath you! Make sure you are ready to balance the bike! Uneven ground or lack of familiarity could make the bike want to lean one way or the other. With your feet ready to balance the bike, this should be no big deal. The slower you are going when deploying the wheels, the smoother the transition will be from wheels up to wheels down. Practice these maneuvers until you are comfortable with the wheel adjustments and the system operation.

SEMI-AUTOMATIC DEPLOYMENT: Another way to deploy the legs is to hit the left button while you are running at any speed over 10MPH with the wheels up. The bottom or yellow LED should start to flash. When you slow down to around 8MPH the wheels will start to deploy (see the red/green flash on top LED). Again prepare to put your feet down.

NOTE: The bottom LED Should not be LIT if the legs are up over 10MPH! In the event it is, the wheels will deploy instantly if you try to set them as above; this is dangerous! You MUST re-visit the sections on testing the proximity sensor. You should always be aware that this light should NOT be on if you are traveling at speed, and 'Arming' the system for deployment should only be attempted if the lower LED is Not Lit! Please see the User Manual for more information on Proximity Sensor Failure!

The next thing to try is to make a turn right after a dead stop with the wheels down. As soon as you start the bike moving, try a left or right turn immediately by leaning into that turn. You may find that you have to nudge the bike a little bit more than usual to get the bike to lean, and you won't be able to lean as far as you can with the wheels up. Once into the turn, accelerating will raise the wheels. You will hardly notice the wheels coming up unless you see the top LED blinking!

The next thing to try is slow speed maneuvering with the wheels lowered. In a straight line on level ground, you should be able to keep your feet on the floorboards and move the bike forward at very slow speeds (simulate stop and go traffic). I like keeping my feet near the ground during these maneuvers! You can also try small 'Trike' turns; keeping the bike upright at slow speed and making turns as you would in a parking lot. Be aware that if you get over the speed that the legs come up, they will!!! Another thing I like to do is donuts. Start out slow, lean the bike left or right, and make circles at very slow speeds (throttle on, rear brake on, clutch slipping… you know like the cops do!). This helps you get familiar with the wheels being on the springs and allowing a lean angle! Practice, practice, practice!! Enjoy your LegUp System!

LEGUP LITE - ADDENDUM

If you have a Lite System, there are a few differences in the wiring compared to our Regular system.

The plugs and their locations don't change at all! Instead of plugging in the computer to the twelve pin plug, the Relay-Pack gets plugged into this plug. The Relay-Pack will be attached with Velcro as the computer would have been in the same location.

On the LITE system there is no proximity sensor, so ignore the testing and mounting of this sensor, and realize that the three pin plug will be left without a mating connector. We keep this plug in the wiring harness in case you upgrade to a regular system in the future.

Using Your Lite System:

Unlike our Regular System, you don't turn the **LITE** system on, or adjust the legs as described in the **'Maintenance Mode'** section of the manual. When you turn your bike on, the LITE system is ready to go! Press and hold the left button to lower the wheels, press and hold the right button to raise them. No lights will flash; it is up to you to control the system manually!

Please use EXTREME Caution when using the LITE System! Keeping the wheels lowered at speeds over 9MPH can be dangerous. Since the system is manual, please don't allow its' operation to distract you from controlling the vehicle!

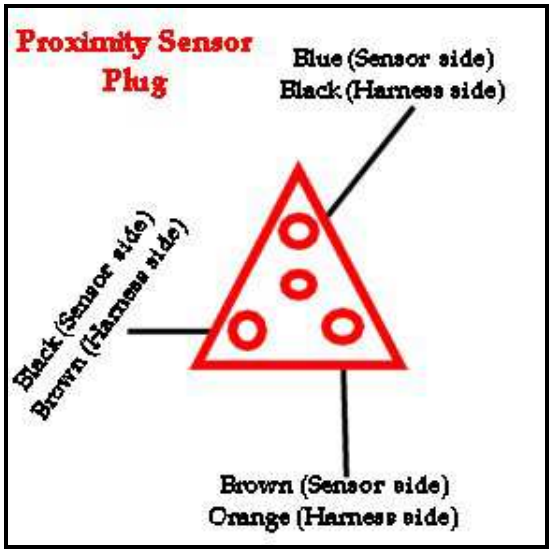
Upgrading Your LITE System:

If you have a LITE System and have chosen to upgrade it to the regular system, there are just a few things you need to do. Unplug the Relay-Pack, and plug the computer in where the Relay-Pack was attached. Run the wire for the proximity bracket and plug it in, test it, and mount it, as described in the '**MOUNT PROXIMITY SWITCH'** section of this manual.

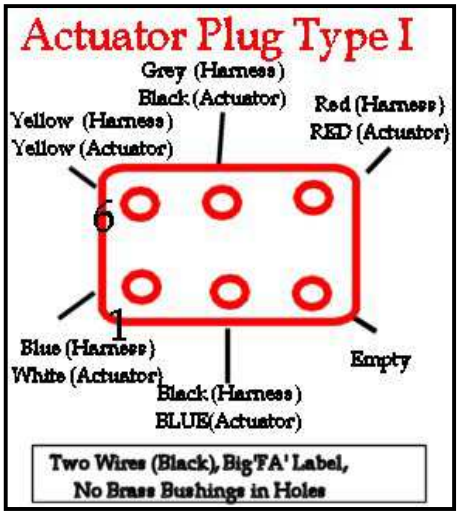
Once the new pieces are attached and plugged in, refer to '**ACTUATOR ADJUSTMENT (Maintenance Mode)',** earlier in this manual to set the lower and upper stops for the computer.

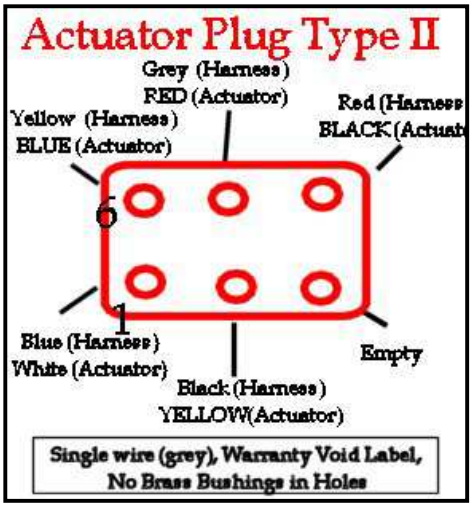
That's all it takes!

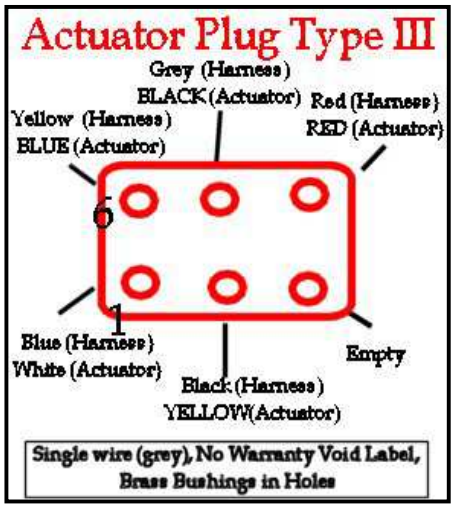
ILLUSTRATIONS



Wiring 1

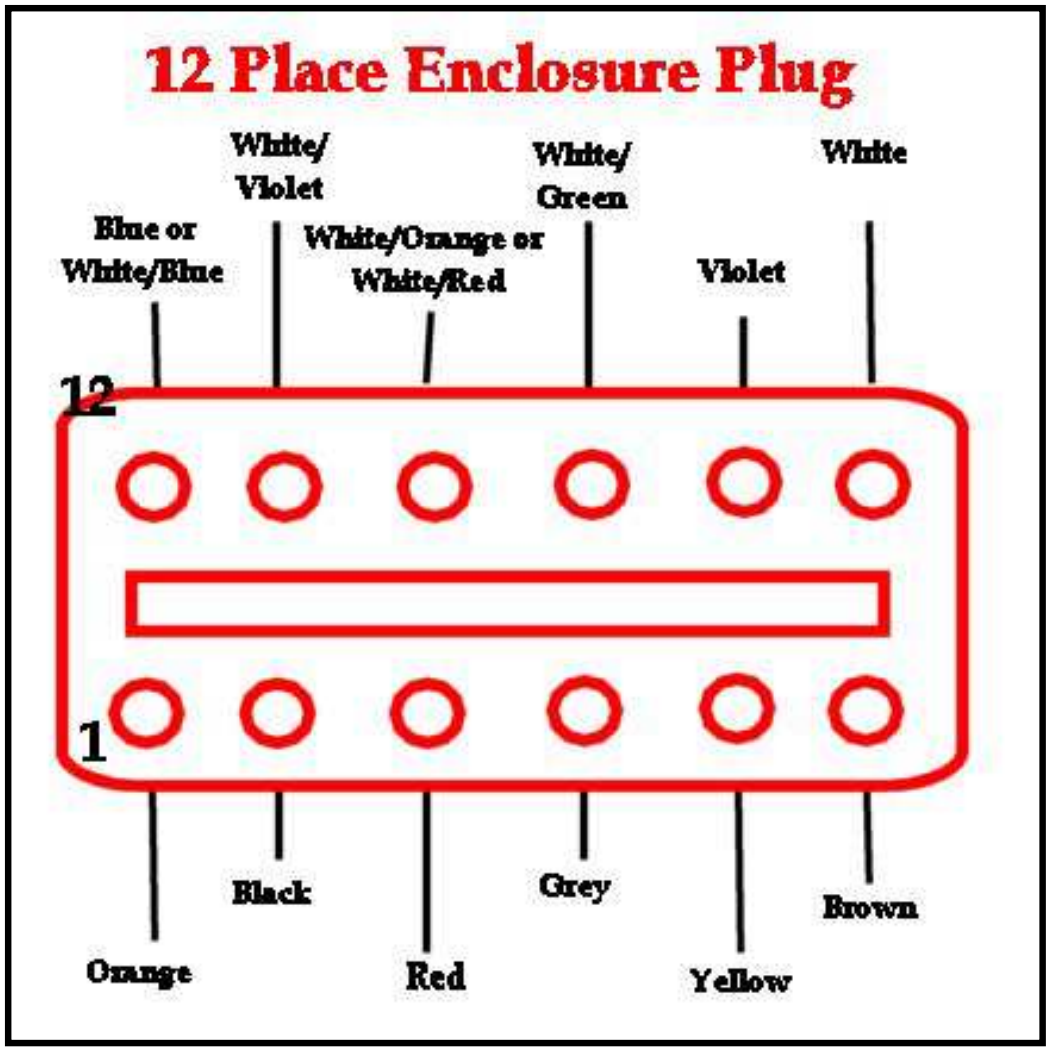






There are three different types of actuators with three different wiring configurations. Refer to the notes at the bottom of the pictures above so you can match your actuator with its wiring scheme!

Wiring 2


12 Place Enclosure Plug
White/
Violet
White/
Green
White
Blue or
White/Blue
White/Orange or
White/Red
Violet
12
1
Orange
Black
Red
Grey
Yellow
Brown

Wiring 3

PARTS LIST

(4) 3/8-16 X 1” Cad Bolts w/ Lock Washers
(2) 5/16 – 18 X 3/4” Cad Bolts w/Lock Washers (Forward Mounts)
(1) 10-32 X 1 5/16” Chrome Allen (Switch Box)
(1) Red Rubber Bumper (Kickstand Bumper)
(1) ¼-20 x 5/8” Chrome Button Head (Bumper)
(1) 5/16” Chrome Washer (Bumper)
(1) ¼-20 x 1.75” Chrome Allen w Nylock (Lower Actuator)
(1) M8 x 30mm (1.25 Pitch) Hex Head (Right Upright)