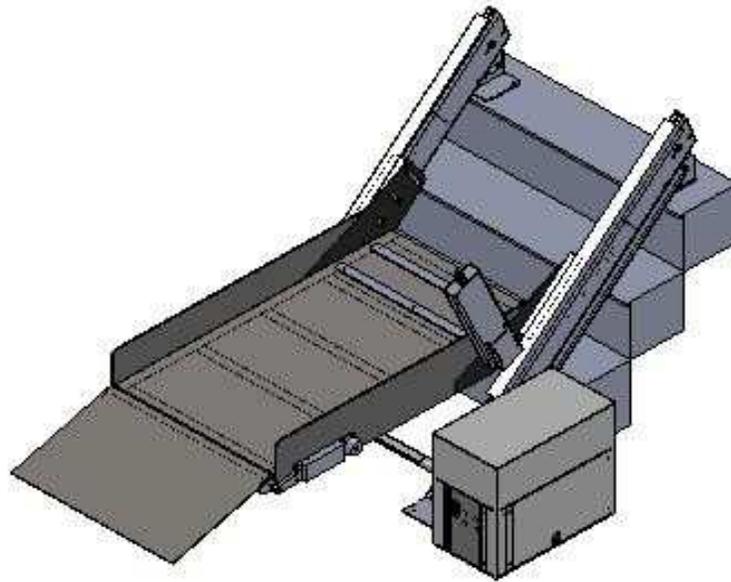


Butler

MOBILITY PRODUCTS



Inclined Platform Lift Installation Instructions 500 and 750 Lb Capacity Lifts

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 1 of 28	Rev 19

Table of Contents

1. Tools Required for Installation:.....	4
2. Locating the Guide Rails.....	4
3. Installing the Telescoping Drive Shaft Coupling.....	6
4. Connecting the Slack/Broken Chain and Lower Limit Switches.....	8
5. Mounting the Platform.....	10
6. Electrical Connections.....	11
7. Installing the Power Unit.....	13
8. Adjustments, Testing, and Final Check.....	15
9. Secure the Lift to the Stairs and Floor.....	20
10. Basic Troubleshooting.....	21
Figure 1: Overall System Assembly.....	3
Figure 2: Leg Assembly and Adjustment.....	4
Figure 3: Standard vs Rails Forward Installation.....	5
Figure 4: Trolley Alignment.....	6
Figure 5: Rail Alignment	7
Figure 6: Slack and Broken Chain Switch Wiring.....	8
Figure 7: Lower Limit and Slack and Broken Chain Switches.....	9
Figure 8: Trolley mount detail.....	9
Figure 9: Platform Installation.....	10
Figure 10: Joystick Assembly.....	11
Figure 11: Platform Control.....	12
Figure 12: Power Unit Alignment.....	13
Figure 13: Power Unit Connector Locations.....	14
Figure 14: Upper Call Station.....	15
Figure 15: Upper Limit and Over Travel Switches.....	17
Figure 16: Lower Limit Switch and Cam.....	18
Figure 17: IPL Power Unit Components.....	23
Figure 18: AC Drive Switches and Connections.....	23
Figure 19: PLC and Input Module Connections.....	24
Figure 20: Functional Wiring Diagram.....	27
Figure 21: Power Unit Wiring Diagram.....	28

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 2 of 28	Rev 19

Butler Inclined Platform Wheelchair Lift

Installation Guide

The Butler Inclined Platform Wheelchair Lift (IPL) is precisely manufactured precisely to the specifications on the standard analysis form. It is completely assembled and tested prior to shipment to insure against errors in manufacture, faulty components, or poor workmanship. After testing, the unit is dismantled and crated for shipment in five separate units: the platform, the power unit, the battery backup and two guide rails (see Figure 1.)

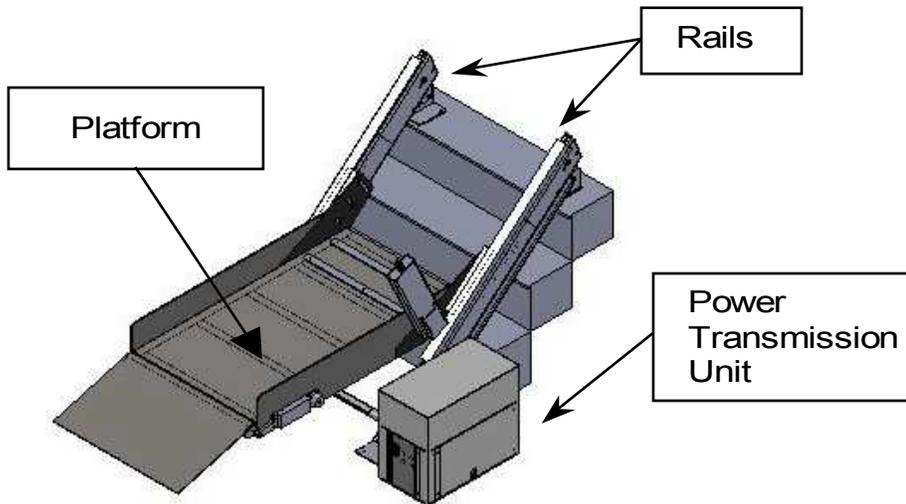


Figure 1: Overall System Assembly

These assembly procedures should be carefully followed to ensure that the lift is correctly located, assembled, and anchored into position in relation to the stairs. The lift must be fully tested as described below before the installation can be considered complete. Please feel free to call with any questions during the installation.

The platform and guide rails are heavy and generally require two or three people to carry each of them. Once the platform and guide rails are in place, two people can usually complete the assembly.

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 3 of 28	Rev 19

1. Tools Required for Installation:

All the necessary screws, nuts, bolts, and other hardware, a drill bit for wood, and a large Allen (hex key) wrench, are supplied in a parts bag packed in the power unit accessory parts box. Concrete anchors are not included. Tools needed include:

- Medium size hammer
- Flashlight
- Electric drill and a hammer-drill if the lift will be mounted on concrete
- Box cutter or similar knife
- A sturdy pry bar for uncrating
- Voltmeter
- Concrete anchors (or Tapcon concrete screws or similar product) and a masonry bit if the lift will be mounted on concrete
- Tape measure
- Small, medium and large screw drivers
- Drift (alignment) pin
- Socket and combination wrenches (up to and including $\frac{3}{4}$ " sizes)

2. Locating the Guide Rails

A. Install the Legs

The legs and feet attach the upper end of the rail to the stairway or top landing, and are not attached to the rail for shipping. First, attach the feet to the legs with about one inch of space between the leg and foot (see Figure 2). Next, attach the leg to the rail. Center the leg in the mounting bracket of the rail.

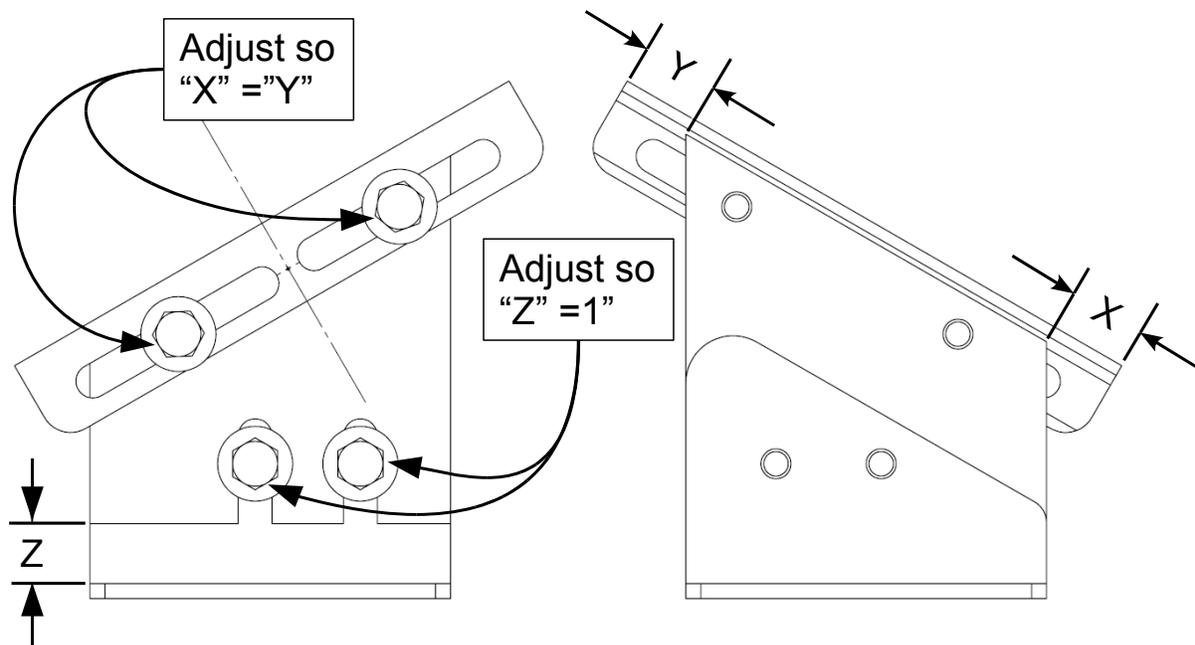


Figure 2: Leg Assembly and Adjustment

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 4 of 28	Rev 19

B. Set the Rails

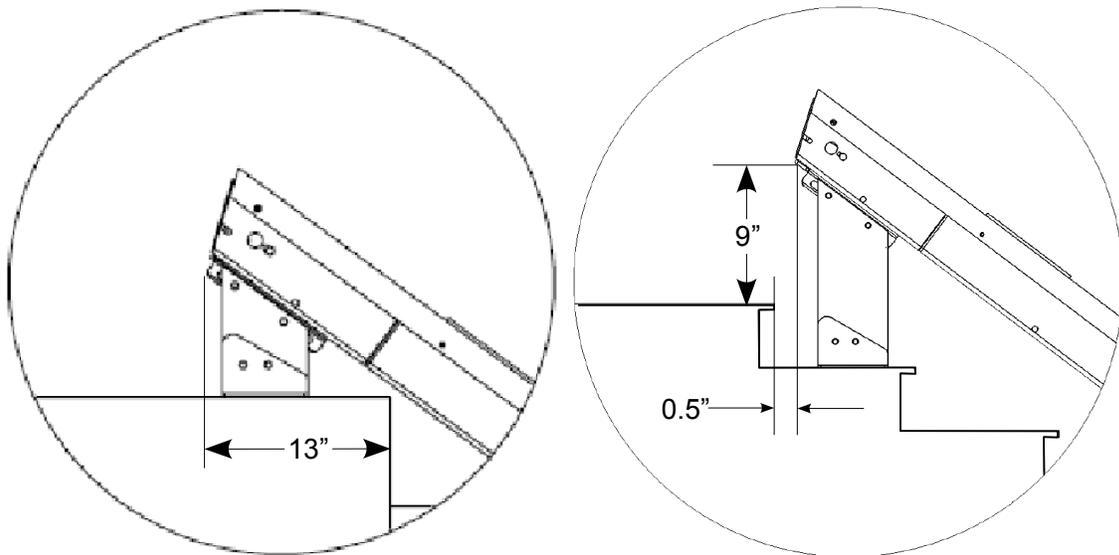
Set both guide rails in approximately the correct location. A cloth or some rosin paper between the upper and lower plates and the stairs or landing will protect the surface.

1) Standard Installation:

In a standard installation (see Figure 3), the upper base plates will sit on the top landing and the rails will intrude approximately 13" into the top landing.

2) Rails Forward Installation:

When a doorway or other obstruction is present at the top of the stairway, the lift is built "rails forward" with the guide rails forward (away from the steps) and higher. The guide rails will be approximately 9" higher above the steps than in a standard installation and come to within one-half inch of the top landing. The upper base plates will rest on the first step not on the top landing.



Standard Installation

Rails Forward Installation

Figure 3: Standard vs Rails Forward Installation

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 5 of 28	Rev 19

3. Installing the Telescoping Drive Shaft Coupling

A. Position the Trolleys

- Move the trolleys (Figure 4) to the bottom of the guide rails before installing the telescoping drive shaft between the rails.
- Position the trolleys by measuring from the end of the guide rails to a point on the trolleys as illustrated by dimensions “A” and “B” of Figure 4. *Tip:* positioning the trolleys so that the pin holes on each guide rail drive shaft and coupling are facing up makes it easier to align the holes and drive in the split pins.
- Note: even if the pin holes on the shaft and coupling are lined up, it *IS* possible to connect them half a turn out of alignment. Marks are placed on the telescoping drive shafts at the factory to correctly align the left and right halves of the shaft.

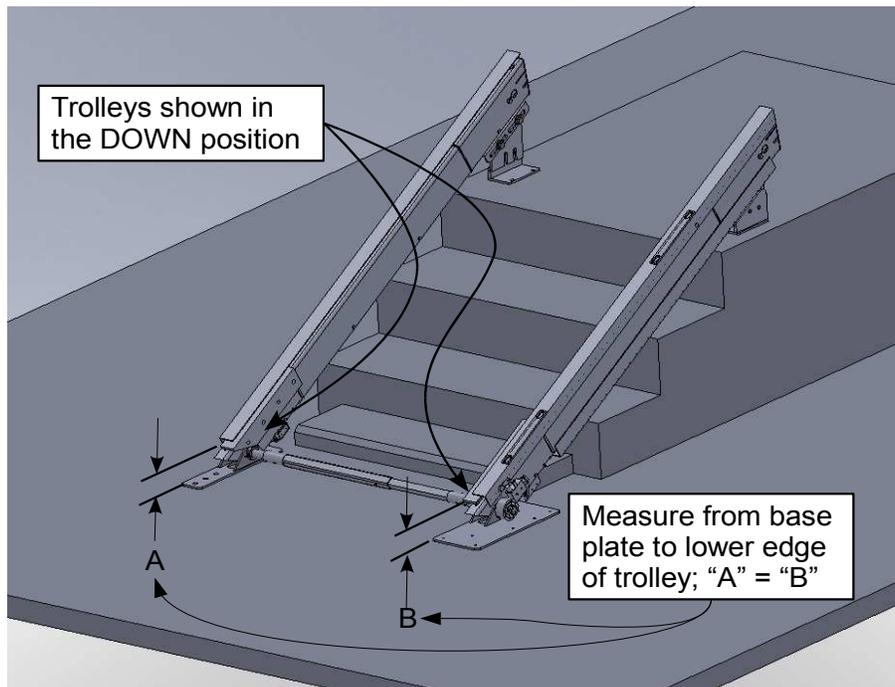


Figure 4: Trolley Alignment

B. Install the Drive Shaft

- Push the ends of the drive shaft coupling together so it will clear the guide rail drive shafts extended from each rail.
- Place it between the drive shafts and extend the drive shaft coupling so that each end socket of the coupling slides over the drive shafts extended from the guide rails.
- Align the two sets of holes in the drive shaft coupling with the two sets of holes in the drive shafts. The coupling should line up with the shafts and slide on fairly easily. If this is not the case, rotate one of the guide rails a little until the shaft lines up with the socket of the coupling. (A small amount of lubricant placed on the drive shafts will allow the coupling to slide on more easily.)

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 6 of 28	Rev 19

- Check that each of the trolleys is the same distance from the end of the rail, as it is easy to get one shaft half-a-rotation off from the other.
- Drive two pins into each end of the coupling with a hammer. (**CAUTION:** Do not attempt to operate with fewer than two pins in each side of the coupling.)
- Next, align the hole in the center of the coupling by spreading or closing the distance between the guide rails. When the hole is aligned, install the pin furnished. This will set the proper distance between the guide rails at the lower end.

C. Verify Rail Placement

- Verify that the left-right placement of the rails is correct. Measure the distance between the two guide rails directly above the drive shafts and coupling and set the spacing of the two rails at the top landing to the same distance (dimensions A and B in Figure 5).
- Use shims under the feet and adjust the legs as required to make the rails parallel and level to each other (C should be level with D in Figure 5). Place a level on the axle and shim the feet as needed to make it level.
- **Note:** The final spacing between the rails will be set when the platform runs to the top of the lift. **DO NOT ATTACH TO THE FLOOR AT THIS TIME.**

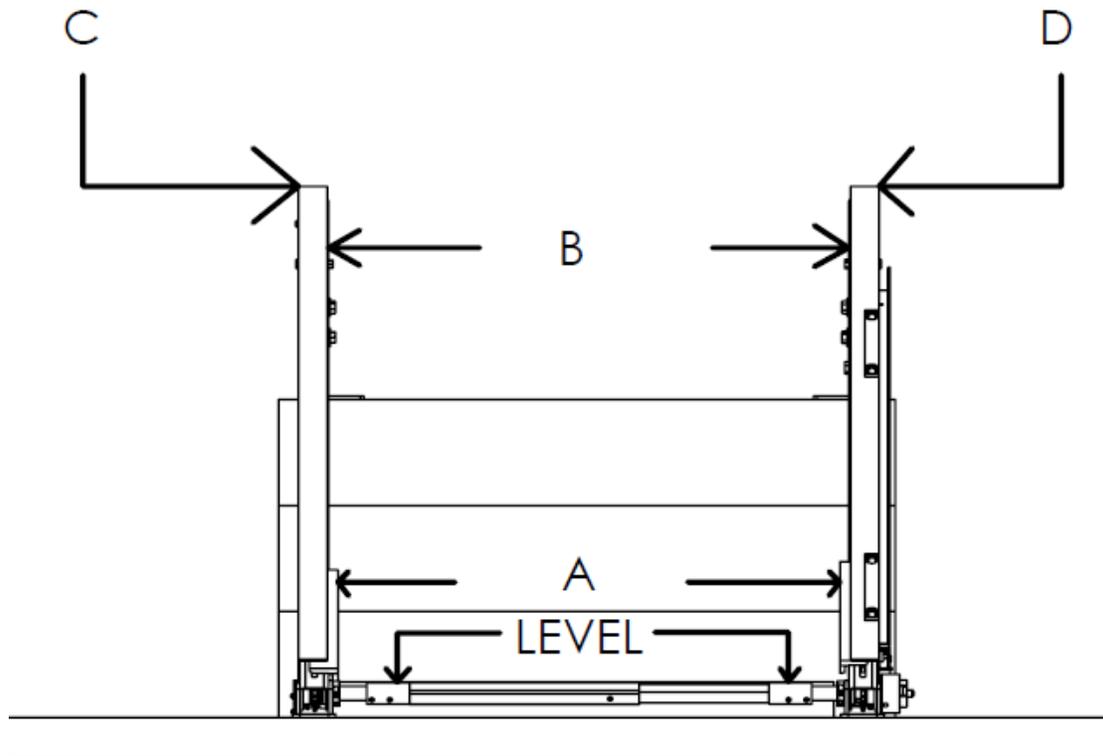


Figure 5: Rail Alignment

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 7 of 28	Rev 19

4. Connecting the Slack/Broken Chain and Lower Limit Switches

The Slack/Broken Chain Switches and Lower Limit Switch share a four-pin circular connector which plugs into the power unit.

The slack/broken chain switches are the two smaller switches attached to one common cable. There is one for each rail. Run this cable under the guide rail on the motor side and attach the switches to the rails (Figure 6), making sure that the arm of the switches fall into the cutouts under the guide rails as illustrated. Tighten the screws into the pre-drilled and tapped holes in the mounting tabs on the underside of the guide rail. Over-tightening the screws can damage the switches. Secure the cable to the feet with the clips provided.

The lower limit switch is the largest of the three switches. Attach the switch to the side of the rail near the drive shaft on the side nearest the power unit (see Figure 7). Use the pre-drilled and tapped mounting holes mounting holes provided and tighten the screws. Over-tightening the screws can damage the switch.

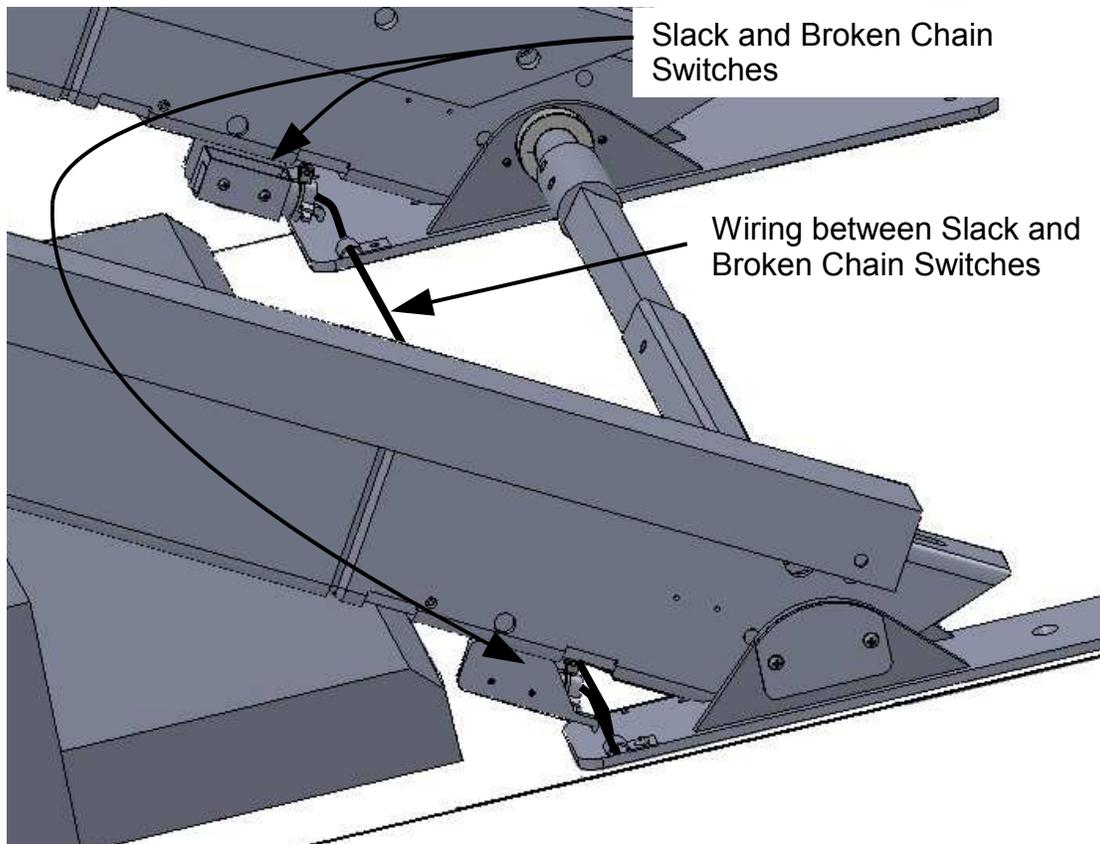


Figure 6: Slack and Broken Chain Switch Wiring

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 8 of 28	Rev 19

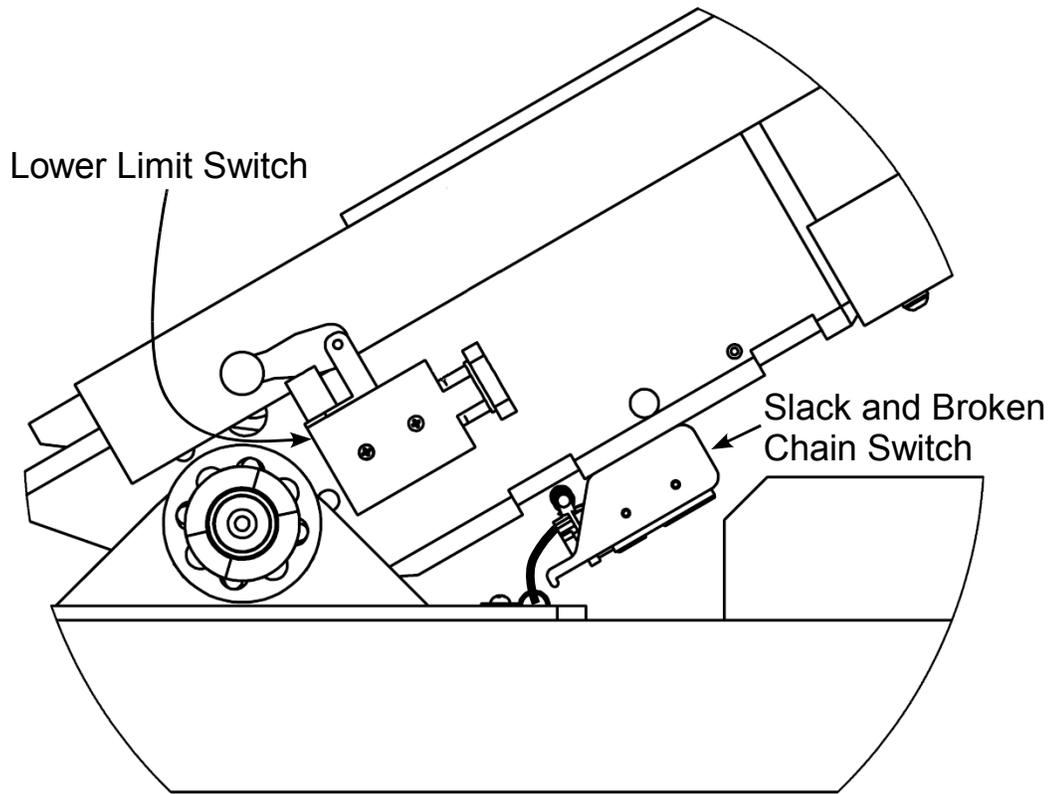


Figure 7: Lower Limit and Slack and Broken Chain Switches

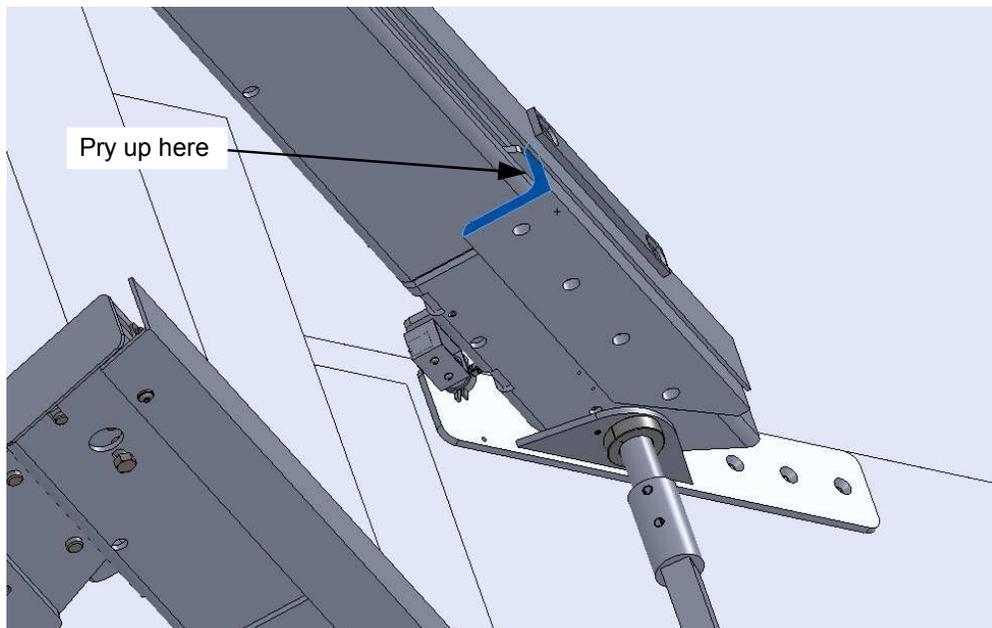


Figure 8: Trolley mount detail

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 9 of 28	Rev 19

5. Mounting the Platform

CAUTION: Platforms with the optional Folding Ramp and Guard have a small roller switch on the opposite side of the platform from the power unit. **Be very careful not to damage this switch when mounting the platform.**

Carefully set the platform into position between the two guide rails (see Figure 9). Align the four holes on the angle plate bracket located on each side of the platform with the four holes on the side of each trolley, and then install the 4 hex-key (Allen wrench) button head cap screws on each side. A drift or alignment pin might be helpful. Prying the front or back of the platform with a pry bar may help with aligning the holes.

Caution: Be careful not to damage the safety apron on the bottom of the platform or the safety bars at the front and rear of the platform.

Insert a pry bar or large screwdriver between the rail and the trolley at the top of the trolley (see Figure 8). Tighten the four button head cap screws while prying the trolley away from the rail. This will preload the trolley bearings into position and prevent platform sag when in use.

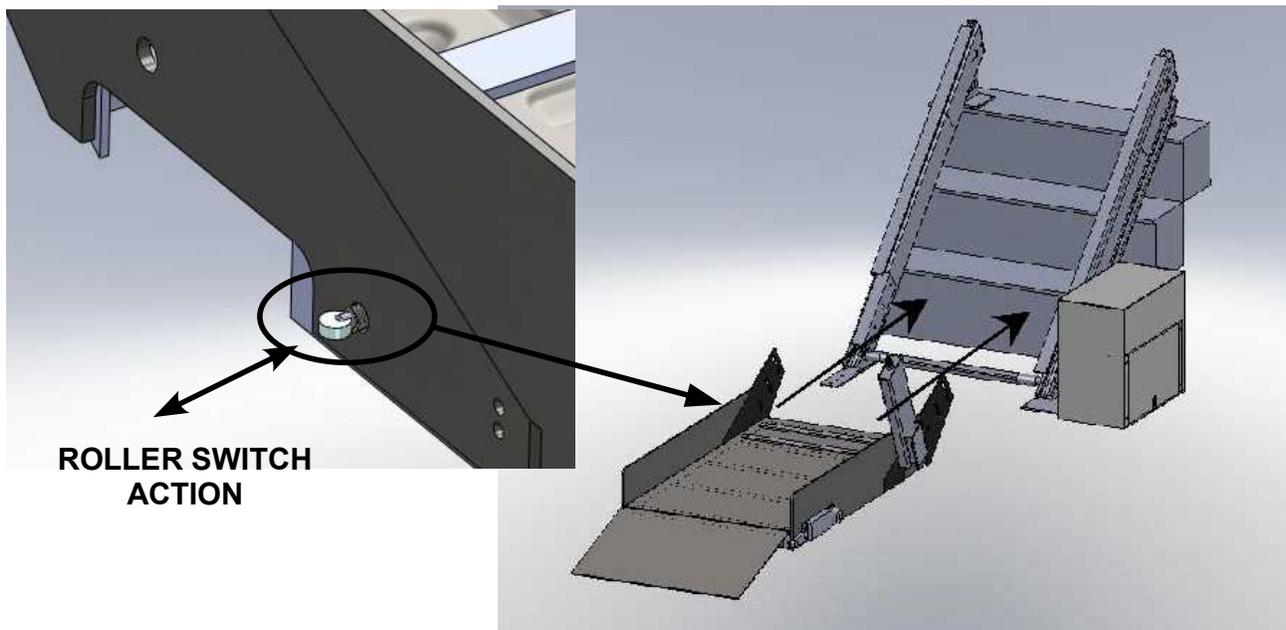


Figure 9: Platform Installation

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 10 of 28	Rev 19

6. Electrical Connections

A. Installing the platform control switch

Remove the end cap from the control tube. Separate the joystick into two pieces by pushing the terminal block and handle together and twisting counterclockwise. Insert the handle through the end cap and re-attach the terminal block end by pushing together and twisting clockwise (see Figure 10). Tighten the two screws in the metal mounting base of the terminal block to secure the joystick to the end cap.

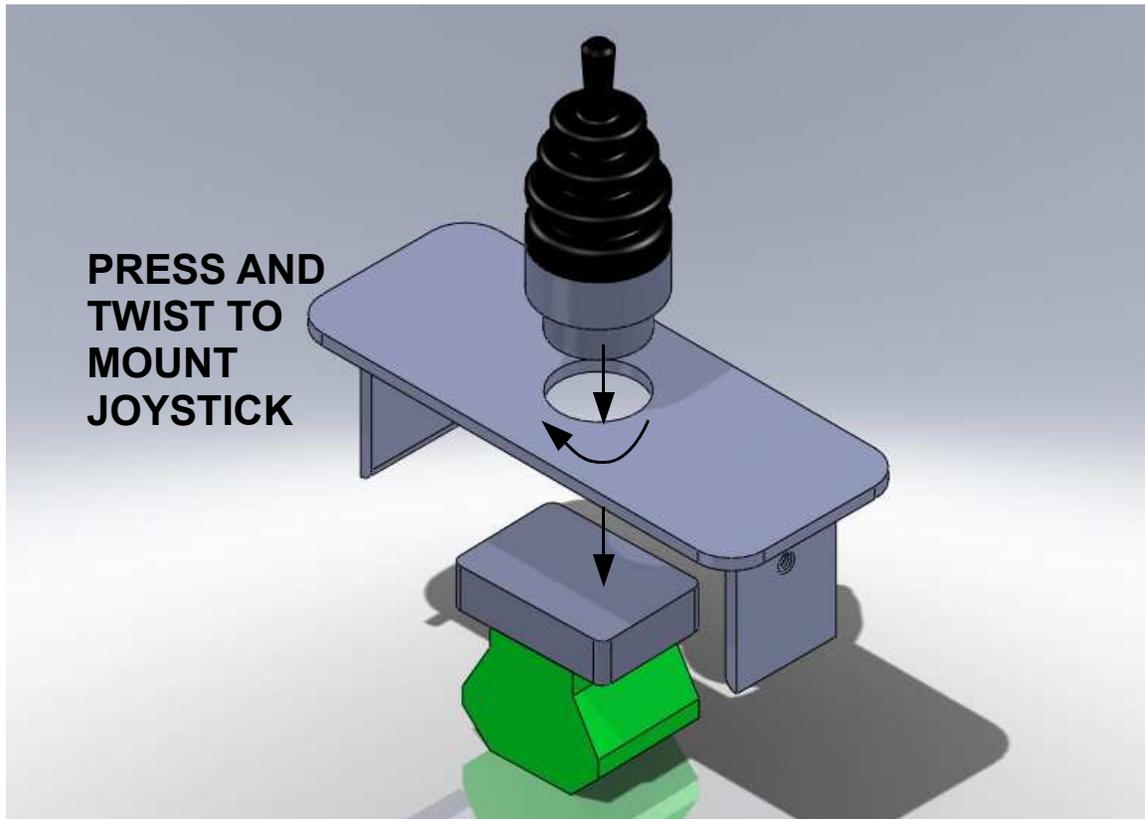


Figure 10: Joystick Assembly

Locate the follow cable, which is attached to a protective “link conduit”, on the power unit side of the guide rail. Attach the cable bracket to the base of the control tube by screwing two 10-32 round head screws and lock washers into the drilled and tapped holes. Feed the remaining wire through the nylon plug and up through the control tube.

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 11 of 28	Rev 19

Make the following connections to the follow cable using the included wire nuts:

FROM:			Follow Cable:	
Label	Color	Source	Label	Color
1	black	apron (under-pan) switch	1	black
1	black	rear safety switch (bar switch)		
1	black	key, or control switch if no key		
1	black	magnetic sensor		
2	black	magnetic sensor	2	brown
3	red	control switch	3	red
4	white	apron (under-pan) switch	4	orange
5	white	control switch	5	yellow
6	black	Emergency stop switch	6	green
7	black	Emergency stop switch	7	blue
8	white	rear safety switch (bar switch)	8	white

Re-attach the platform control switch to the platform control tube.

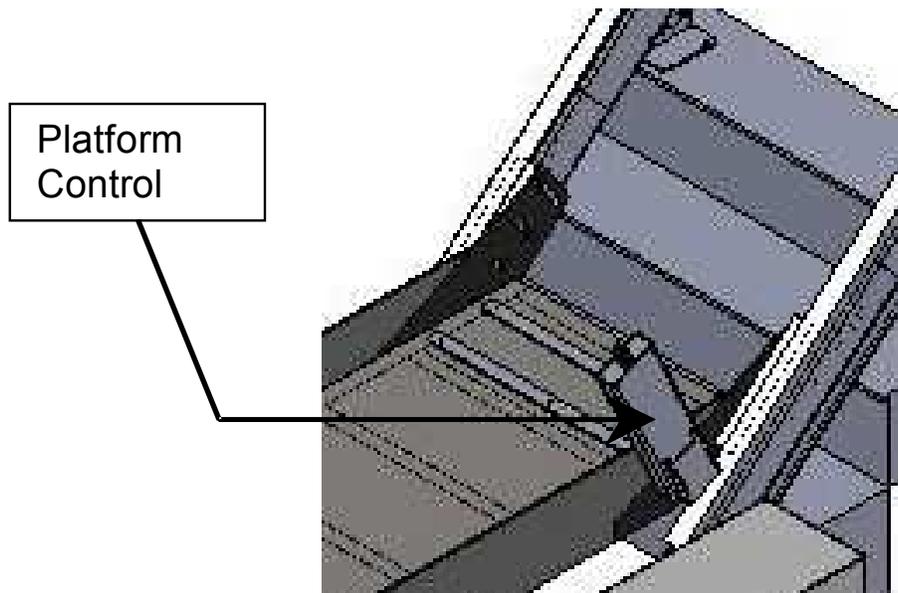


Figure 11: Platform Control

7. Installing the Power Unit

The power unit coupling corresponds to the rail coupling coupling on the drive shaft extending from the guide rail as shown in Figure 12. The teeth need to be aligned before the couplings may be mated together; this is easily done with the ratcheting feature of the rail coupling.

- Simply turn the rail coupling in the ratcheting direction (counterclockwise for right-hand drive, clockwise for left-hand drives) to align the two teeth of the rail coupling with the power unit coupling teeth.
- Line up the coupling on the power unit with the coupling on the drive shaft and push the power unit toward the rail until they mate up (see Figure 12). Be careful not to move the guide rails. Do not anchor the power unit to the floor until Section 9.

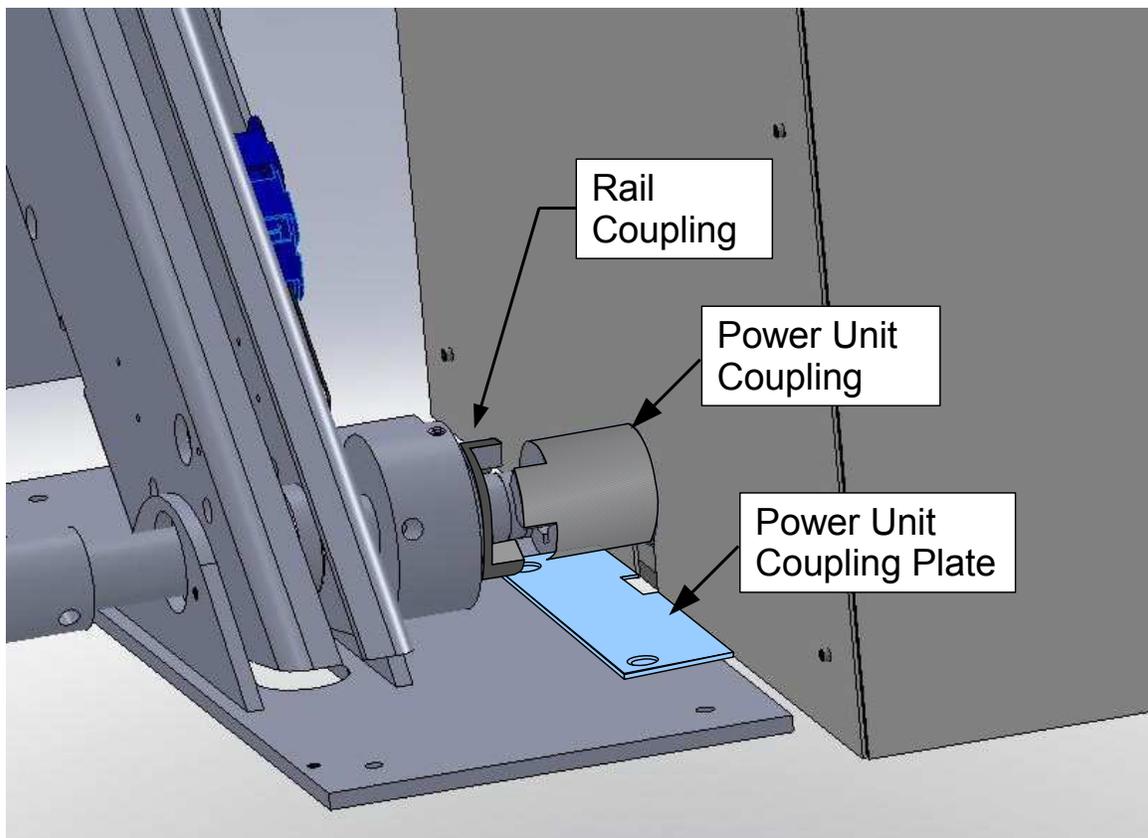


Figure 12: Power Unit Alignment

- Place a small level between the two couplings after they are mated. Make sure that the two couplings are as close to alignment and as level as possible. Shim the power unit and/or the rails as needed if the couplings are not aligned or level.
- Attach the coupling plate from the power unit to the mounting foot with the provided 3/8-16 bolts and lock washers.

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 13 of 28	Rev 19

A. Connecting the Cables

Three cables connect to the power unit with circular plastic connectors; the guide rail, slack/broken chain and lower limit switch, and lower call-send cable. Each connector is unique and will not mate to the wrong location.

- 1) The **slack/broken chain** and **lower limit switches** are wired into the same four-pin circular connector. Insert the connector into the lower left jack (J1 on Figure 13). Rotate the body of the connector until it matches the receptacle, then plug it in and turn the coupling ring clockwise approximately one turn (until you feel a “click”) to complete the mating.
- 2) The **lower call-send switch** connects through a seven-pin connector (J3 on Figure 13). Insert the connector into the lower right jack. Rotate the body of the connector until it matches the receptacle, then plug it in and turn the coupling ring clockwise approximately one turn (until you feel a “click”) to complete the mating.
- 3) The **guide rail cable** also carries the **upper call-send switch** and **platform controls/follow cable**. It exits the rail near the foot and connects through a 14-pin connector (J2 on Figure 13). Insert the connector into the upper center jack. Rotate the body of the connector until it matches the receptacle, then plug it in and turn the coupling ring clockwise approximately one turn (until you feel a “click”) to complete the mating.

B. Switch Installation

- 1) Mount the upper call-send station at a location convenient to the top of the lift and from where all lift operation is visible.
- 2) Mount the lower call-send station at a location convenient to the bottom of the lift and from where all lift operation is visible.

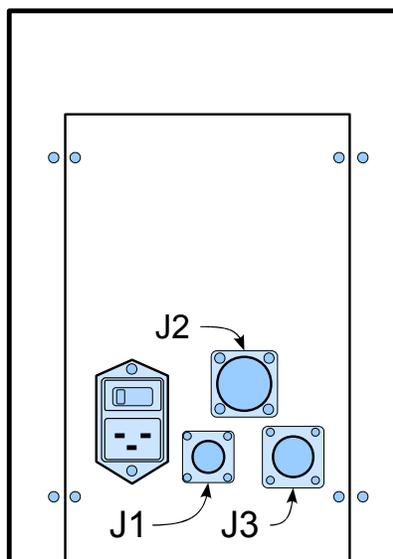


Figure 13: Power Unit Connector Locations

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 14 of 28	Rev 19

8. Adjustments, Testing, and Final Check

Note: In this step, if the rails are not the correct distance apart, the platform will pull on the rails and correct the distance between them as it approaches the top landing, and the upper base plates may scratch wooden stairs or landings. A cloth or some rosin paper between the plates and the stairs or landing will protect the surface.

A. Initial Checks

Turn on the lift using the rocker switch on the power unit next to the power connection. Cautiously operate the lift. Verify the following:

- 1) Correct travel direction with the joystick and lower call station.
- 2) Step clearance – Run the platform a short distance up and down, making sure it misses the nose of the step. Adjust per Section B1 if it does.
- 3) Press on the rear bar switch – upward travel should be stopped and prevented.
- 4) Raise the platform, reach underneath the platform and press on the apron switch – downward travel should be stopped and prevented.
- 5) Magnetic sensor: return the platform to the bottom. Press on the lower limit switch switch (if not engaged), release the switch, run the platform up about one foot, and back down. The platform should slow as it approaches the bottom.
- 6) Upper Limit: Ride the platform to the upper landing while making sure it misses the nose of each step. The platform should slow as it approaches the top, and be barely moving as it stops. Adjust per Section B1 and B2 as needed to stop level and within ½ inch of the top landing.
- 7) Push in the platform Emergency Stop, then reach inside the rail end and depress the right-hand roller switch (upper over travel). Press the button on the bottom of the upper call station (over travel escape – see Figure 14) while holding the over-travel switch. The platform should move down slowly and stop when the either switch is released. It will not travel for more than one second without releasing and pressing the over-travel escape button. Pull the Emergency Stop out and ride the platform down.

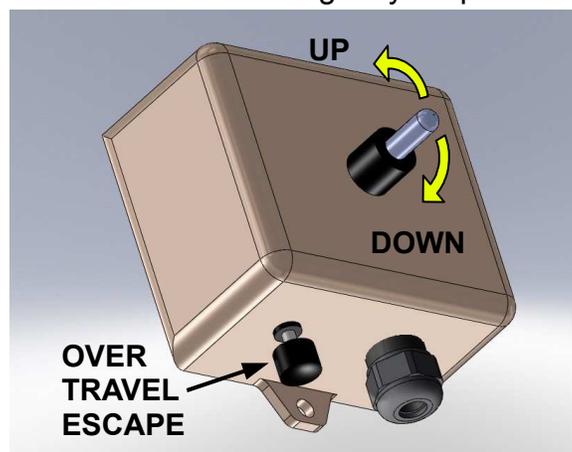


Figure 14: Upper Call Station

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 15 of 28	Rev 19

B. Adjustments

The platform should stop level and within one half inch of the top landing.

1) Stair Clearance

If the platform should touch a step on the way up, the safety bar at the rear of the platform will be pushed in and the bar switch will stop the lift.

- Pull the entire lift away from the steps. If needed, there are several inches of lateral adjustment available where the top mounting brackets attach to the rail.
- Raise the rails a little at the top by loosening the two bolts at Figure 2 and raise or lower the rails. **Caution: changing this height can change the angle of the platform!** Be sure that both rails are exactly same height and angle.

2) Upper Limit Adjustment

When the platform reaches the **top landing**, it should stop exactly level with the top landing. The height at which it stops is controlled by the **upper limit switch**. The upper limit switch and the over travel (safety) switch are located at the top of the rail on the motor side, under a cover. See Figure 15.

The device that actuates the top limit and over travel switches is called a cam. It is located on the trolley inside the rail on same side as the power unit. It is held in place by spring tension and friction. It can be adjusted using the **travel switch adjustment tool**, which is included with each lift. Adjust the cam by inserting the adjustment tool into the hole and **either pull or push** the cam. **DO NOT** rotate the cam when adjusting.

- If the platform stops below the level of the landing, push the cam downward (toward the bottom of the stairs) with the adjustment tool. This will make the platform run a little higher before the cam actuates the switch.
- If the platform stops above the landing level, pull the cam upward (toward the top of the stairs) to stop the platform level with the top landing. This will make the cam contact the switch a little sooner.
- It is better to adjust this in several small increments rather than trying to do it in one step.
- If correct positioning cannot be achieved with the cam, the micro switches located in the top of the guide rail on the power unit side may also be adjusted forward or backward to obtain the proper stopping position.

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 16 of 28	Rev 19

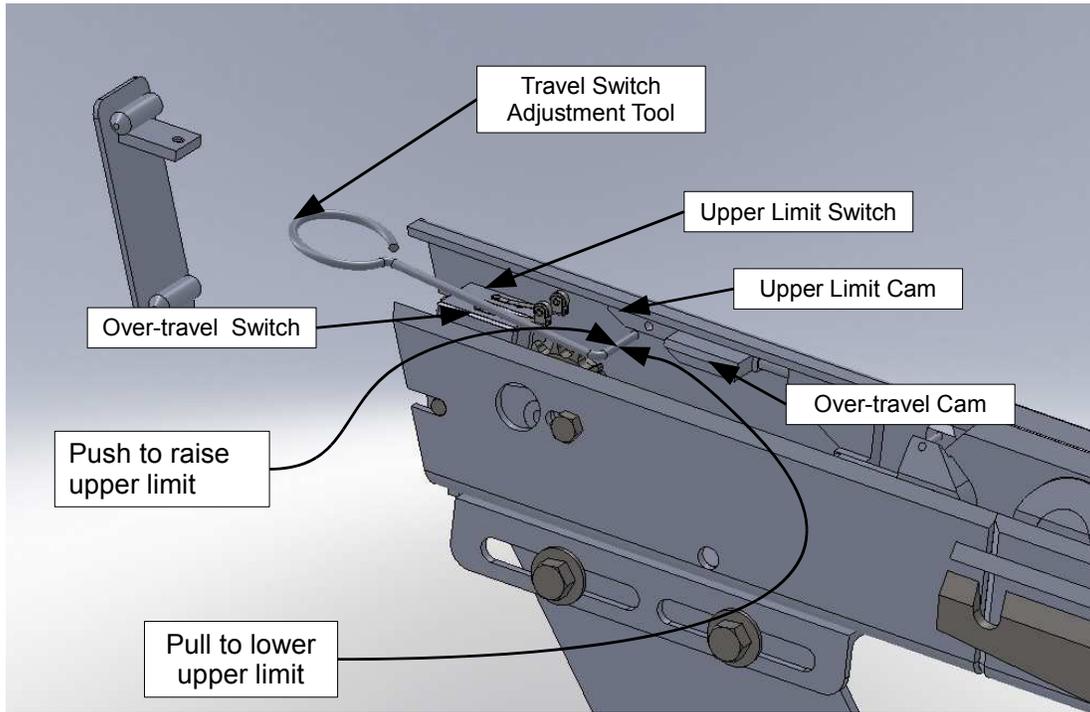


Figure 15: Upper Limit and Over Travel Switches

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 17 of 28	Rev 19

3) Lower Limit Switch Adjustment

After the top position has been set, run the platform to the bottom and check the setting of the **lower limit switch**. The lower limit switch (Figure 16) is actuated by a limit switch cam attached to a threaded rod, mounted on the side of the platform at the bottom of the platform control tube. If the lower limit switch fails to actuate or is out of adjustment, the platform will then contact the floor and either the apron switch or the ratcheting safety clutch will prevent damage to the platform.

The gradual deceleration triggered by the magnetic sensor allows the platform to be moving very slowly when it stops, so the lower limit adjustment is critical to a gentle stop. Adjust the lower limit switch cam if the platform hits the floor too hard or stops above the floor:

- To stop the platform sooner (higher), adjust the lower limit switch cam away from the stairs.
- To allow the platform to travel lower, adjust the lower limit switch cam back toward the stairs.
- Adjust the lower limit switch if the cam does not meet the cam – loosen the bolt (marked as “Lower Limit Switch Adjust” in Figure 16) and rotate the arm so it meets the cam. Tighten the bolt and verify operation.

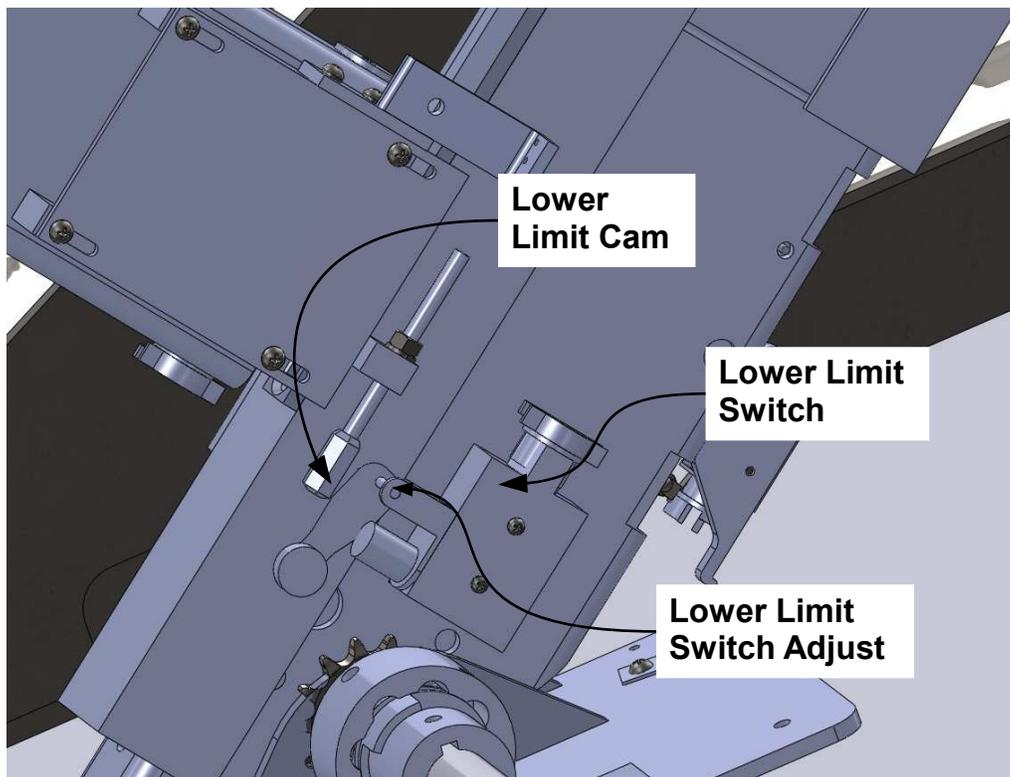


Figure 16: Lower Limit Switch and Cam

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 18 of 28	Rev 19

4) General Check:

After adjusting the limit switches, run the unit up and down several times, checking to make sure that the platform stops at the right place at top and bottom, does not contact any stairs, that the trolleys are not rubbing the rails and the unit is running freely. Test the platform Emergency stop button to make sure it stops the platform while ascending and descending, and that pulling the button out permits the platform to run again.

C. Battery Backup

The UPS (uninterruptible power supply) provides temporary operating power to the lift during periods of power loss and line voltage regulation during periods of high or low voltage. It also has power, overload, and battery status indicators.

Butler Mobility’s Power Transmission Unit and UPS (battery backup) have been subjected to rigorous testing by UL, and has been certified as a system. Warnings in the Triplite manual in regard to using the battery backup with a motor are not applicable because the AC drive controls the current drawn by the motor and the UPS is not subjected to the typical high starting current draw of the motor.

- Plug the UPS DIRECTLY into a dedicated 120V outlet (a circuit breaker wired with only one outlet); do NOT use an extension cord.
- The UPS will go through a self-check when plugged in. Press and hold the ON/OFF button to select the UPS mode if the Line power LED is flashing.
- Contact the factory if the red battery charge indicator is on for more than 12 hours.
- **Test UPS operation ONLY BY OPENING THE BREAKER DEDICATED TO THE LIFT – unplugging the UPS will result in an ungrounded lift and possible damage to the UPS and lift.**

INDICATOR / SWITCH	FUNCTION OR DESCRIPTION
	MODE button - Press and hold for approximately two seconds if Line Power LED is flashing to select the UPS mode.
	Line Power – Green for normal UPS mode, flashing when in “Charge only mode” to indicate no backup available
	Voltage regulation – on if UPS is correcting for high or low line voltage
	Overload – RED light for overload while on battery power
	Battery Power – YELLOW when on battery power
	Battery Charge – RED for low charge
	Horn (alarm) – press to cancel alarm

9. Secure the Lift to the Stairs and Floor

Once the unit is running smoothly, you are ready to fasten the unit down.

Install the anchor screws provided through the holes into the floor at the bottom base plates on each guide rail. Next, secure the power unit, by installing the anchor screws through the base of the power unit and into the floor. Use the insert provided or other means of mounting if on concrete.

To fasten the upper base plates, run the platform up to the top landing. Make sure that the pads on the bottom of the upper base plates are lying flat. To adjust these pads, lower the platform to the bottom of the stairs to take the weight off the rails at the top. Support the rail, then loosen the two bolts at Figure 2 just enough to permit each upper base plate to move and find its position on the landing level. Tighten them when you're done. **Run the platform to the top again to make sure it doesn't touch any steps.**

Secure the base plates to the top landing (or top step) with the provided anchor screws. Use the inserts provided or other means of mounting if on concrete.

Install the wood filler strip (furnished with unit) between the back edge of the platform and lower step. This wood filler can be fastened to the floor with screws through the pre-drilled holes.

The lift is now ready for operation.

We at Butler Mobility thank you for installing our Inclined Platform Wheelchair Lift. We hope the installation went smoothly... we are always available if you have questions or problems.

Butler Mobility Products, 629 Lowther Road, Lewisberry, PA 17339
717-938-4253; 717-938-4238 (fax); www.butlermobility.com

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 20 of 28	Rev 19

10. Basic Troubleshooting

Note: voltage measurements such as “0 V” and “24 V” are made by securing the voltmeter negative lead at lower TB9 (the 24 V power supply ground), or a point connected to it, such as C3 on the left ziplink terminal block or the range of lower terminal blocks TB6 to TB10. Place the voltmeter positive lead on the screw terminal at the point to be measured, such as left Ziplink module X3. The left Ziplink terminals are the same points as the PLC (such as X1 to X8), and the right Ziplink terminals (C1, C2, 1, and 2) are the same points as the Input module. Reference Figure 17 for component locations.

A. Check the following if the lift fails to operate:

1) Power

- Is the dedicated breaker turned on?
- Is the UPS plugged in and powered up? Check Section 8C.
- Is the PLC “PWR” lamp lit? (See Figure 17) If not, check the AC power cord and power switch.
- Is the AC drive LED display lit? (See Figure 17.)
- Are key controls (if present) turned on? If the power is good and keys are on, proceed to checking the Safety Relay in Step 2 .

2) Safety Relay

The LED on the safety relay indicates that the Slack or Broken Chain, Upper Over travel, and Emergency Stop switches are closed, and must be lit for the lift to operate. If it is not lit, then:

- Check that the three connectors on the front panel of the power unit are securely plugged in (Push in and turn the coupling ring to the right.) **Tip:** the slack and broken chain switches share the J1 connector (see Figure 13) with the lower limit switch. If one is not working, the other may not be, too.
- Check that the connectors on the PLC, Input module, and Ziplink modules are securely plugged in.
- Verify that all Emergency stop switch is pulled OUT and the X8 indicator on the PLC is lit (and terminal X8 is 0 V).
- If the E-stop switch is pulled out and the X7 and X8 indicators on the PLC are on (see Figure 19), then measure the voltage at Safety Relay terminal A2. It should be less than 0.5 V if the slack and broken chain switch is closed (see Table 1 and reference Figure 17 for component locations.) Check the slack and broken chain switch action (see Section 4) if the switch is not closed. Otherwise, proceed to check the PLC.

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 21 of 28	Rev 19

Table 1: Safety Relay Test

Component	Test point	Voltage	Condition
Power supply	Relay term A1	24 V	Normal operation
Safety relay, Slack Chain switch	Relay term A2	0 V	All emergency stops released, slack chain and over travel closed.
E-Stop Switches	Left Ziplink Terminal X8	0 V	All E-stop Switches pulled out
Over-travel switch	Left Ziplink Terminal X7	0 V	ALL E-stops out, over travel closed

3) **Programmable Logic Control (PLC):** If the safety relay is lit, then proceed.

- Verify the slide switch is in the RUN position and the flat (“communications”) cable is connected to Port 2 of the PLC and J1 of the AC drive. (Reference Table 2, Figure 18, and Figure 19.)
- The normal state of the Tx2 and Rx2 lamps (reference Figure 19) is to flicker at about one-second intervals. If they are not, move the RUN/STOP switch to STOP, then back to RUN. The PLC Y1 lamp should flash for about 3 seconds, then the Tx2 and Rx2 lamps should flicker, and the Y1 lamp should shine steadily. If this doesn't happen, proceed to step 4).

Table 2: PLC Indicator Status

Indicator	Normal Status	Condition
Power	ON	Power present
Run	ON	Program running. Run/stop must be in RUN position
ERR	OFF	Call for help if lit
Tx2, Rx2	Flickering	Communicating with AC drive

Note: the ERR indicator may appear to be dimly lit, but this is actually some light spilling over from the RUN lamp. If lit or flashing, it will be as bright as the PWR lamp.

- 4) **AC Drive:** lift the cover near the left side of Figure 17 (below) and verify SW2 and SW3 are in the RS232 position. Reference Figure 18. The flat gray (“communications”) cable between J1 of the AC drive and port 2 on the PLC has a mark on the PLC end of the cable. Verify that the marked end of the communications cable is plugged into port 2 of the PLC.

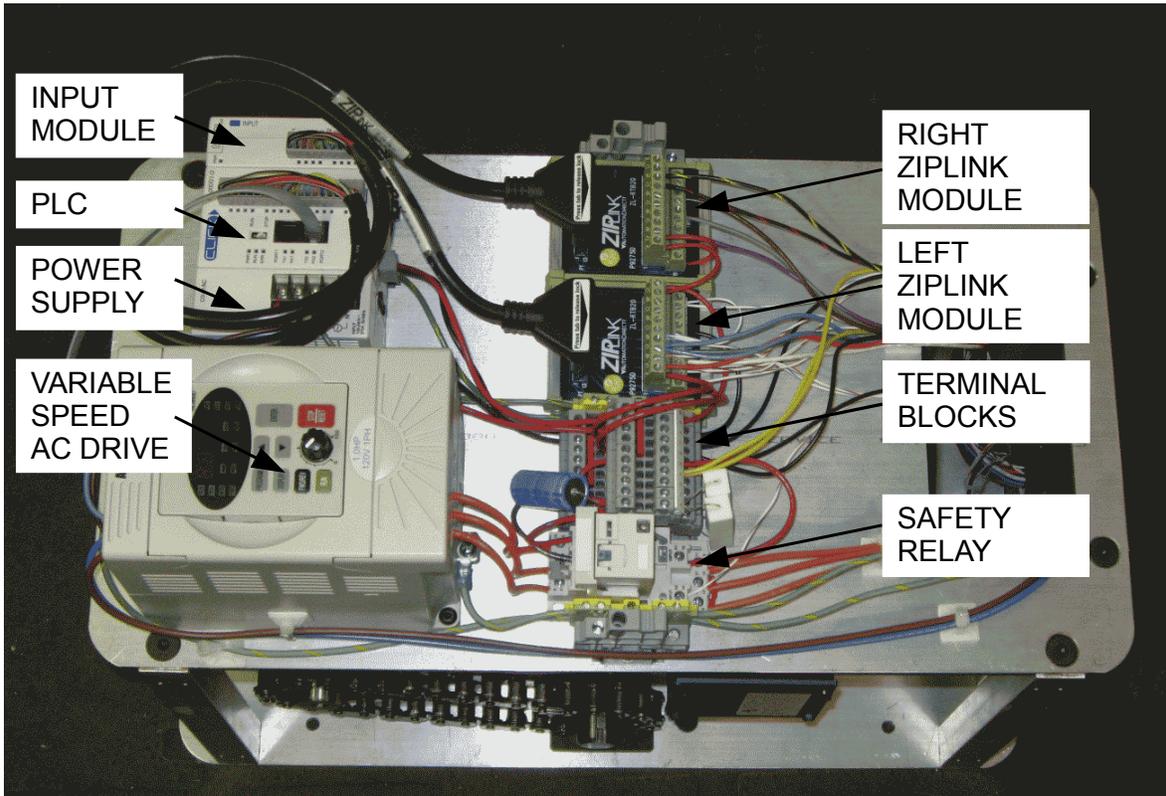


Figure 17: IPL Power Unit Components

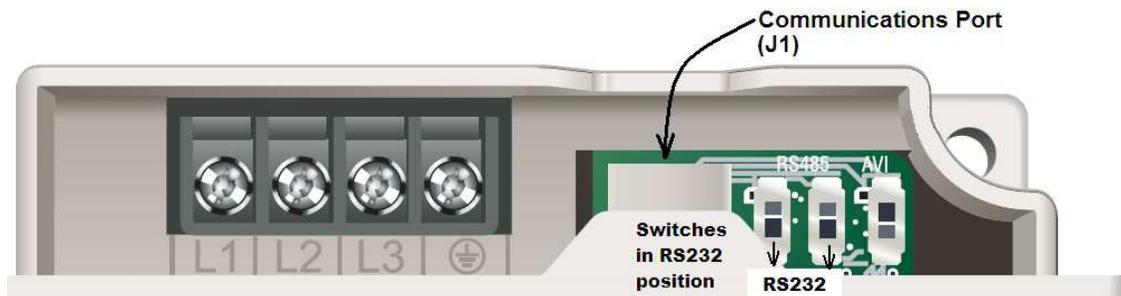


Figure 18: AC Drive Switches and Connections

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 23 of 28	Rev 19

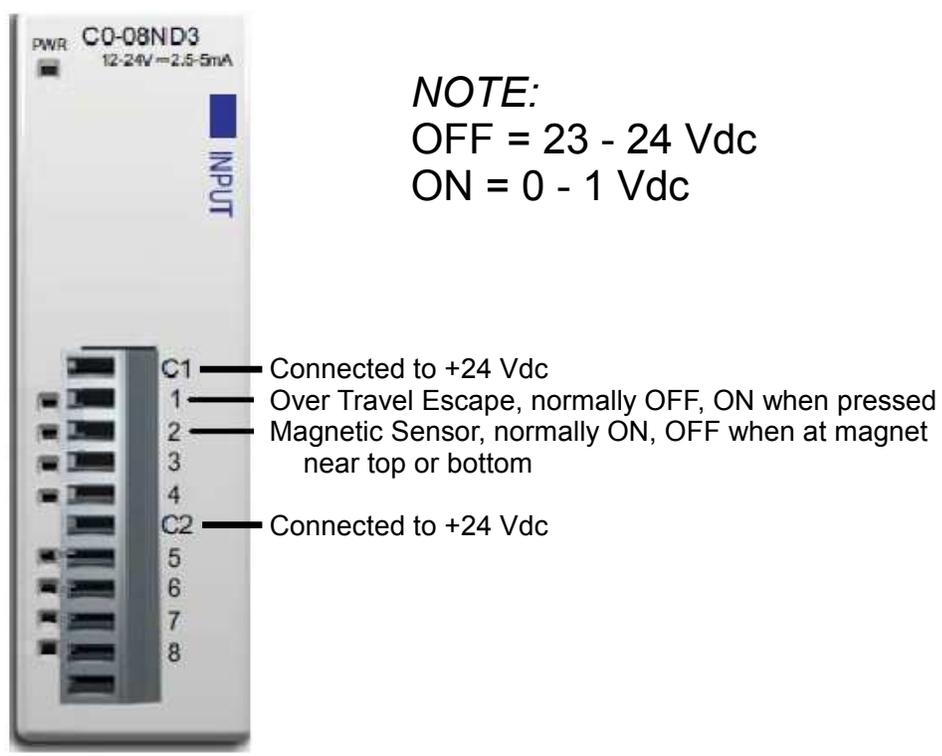
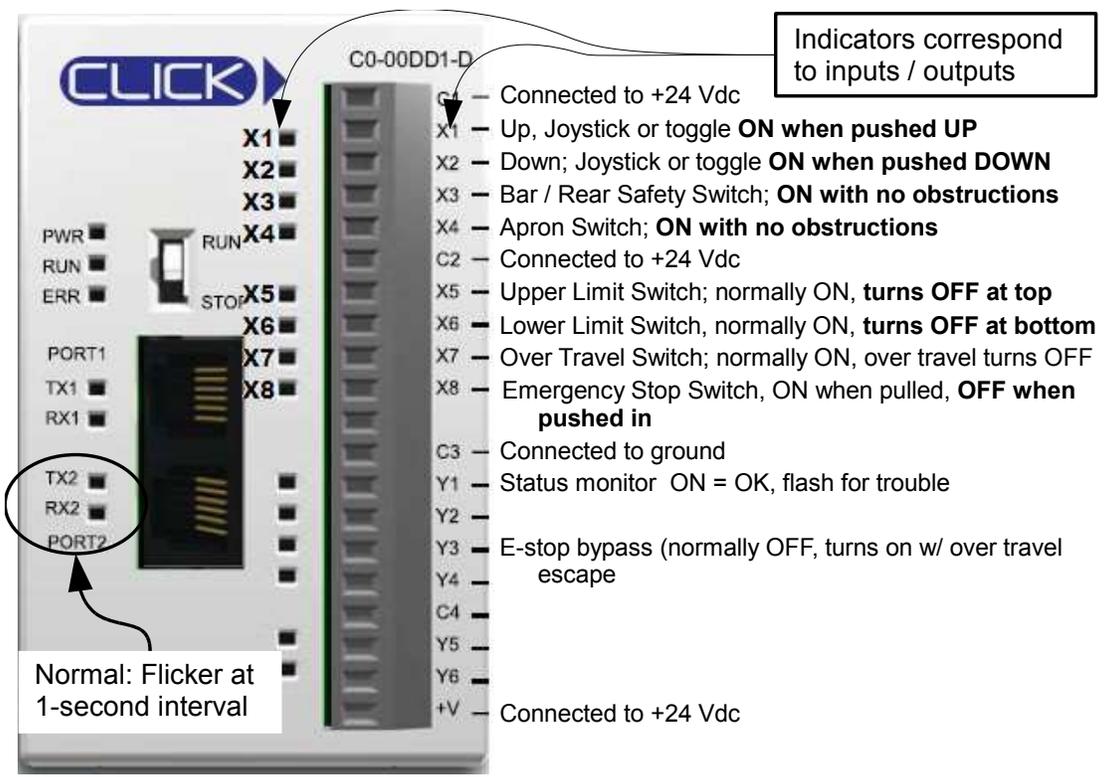


Figure 19: PLC and Input Module Connections

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 24 of 28	Rev 19

B. Lift Control and Operation

1) Lift Operation

PLC inputs X1 and X2 are normally open (NO) UP and DOWN inputs, and are actuated by connecting them to the 24 V ground (0 V on power supply). That path is provided by the platform joystick and the upper and lower call-send toggle switches.

PLC inputs X3 through X6 are connected to normally closed (NC) switches. These inputs are qualifiers to the up and down inputs – the upper limit switch is of no interest while traveling down, but the apron switch is because it senses obstructions under the platform until the lower limit switch is opened by the platform. Likewise, the bar safety and upper limit are the signals of interest when traveling up.

A magnetic sensor in the control tube senses magnetic strips located near the top and bottom of the rail cover. It signals the PLC to slow platform travel near the top and bottom. The platform will travel slowly under the following conditions:

- Downward travel within approximately six inches of the bottom landing.
- Upward travel within approximately six inches of the upper landing.
- Initial start-up until the lower limit switch has been activated.
- PLC memory corruption

2) Over-travel Escape

The lift will be stopped by the over-travel switch if the upper limit switch fails to operate. Opening the over-travel switch will render the lift inoperative until the failure is corrected; one option is to press the platform emergency stop and then press the over-travel escape switch on the bottom of the upper call-send station (reference Figure 14). The platform will travel slightly downward until the over-travel switch closes or for a maximum of one second. Normal operation may then be resumed by pulling the platform E-stop switch out.

C. Installation/Repair

1) Slack and broken chain switch

- These switches are not normally activated (see Figure 7). If connector P1 (see Figure 13) is tight, then check to see if these switches are activated.
- If the safety relay is not engaged and there is no electrical contact through the switches, try to physically move the switch levers and see if the switches are opening and closing.
- If the switches are activated, try tightening the chain by adjusting the tension at the top of the rail and see if the switch lever moves up. Manually move the switch lever to see if the output changes and the relay turns on.

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 25 of 28	Rev 19

- If the chain is cannot be tightened, it may have broken and the safety pawls have opened against the rail. The platform may have to then be supported and removed from the trolleys to keep from obstructing the stairway.

2) Operation

- **Slack/broken chain bypass** –if slack chain switches have opened, but the chain is still good, connect terminal A2 of the safety relay to upper terminal block TB5.
- **Over-travel bypass** – see section B2 (above) or jumper terminal X7 to the power supply ground (lower TB9).
- **Emergency Stop bypass** – jumper terminal X8 to X7.
- **Service/Emergency operation** – the power unit has a service/emergency operating mode which bypasses the upper limit, lower limit, bar/rear safety switch, and apron switch, **ten seconds after switch closure**. The speed is reduced to 50% due to the lack of safeguards. Note that the reduction in speed also lowers the lifting capacity. Upward travel may be actuated by connecting terminal 7 of the right ziplink module to lower terminal block 9, and downward travel by connecting terminal 8 of the right ziplink module to lower terminal block 9. **TO REPEAT: THE LIFT WILL STOP AS NORMAL FOR OBSTRUCTIONS AND LIMITS, BUT WILL RESUME TRAVEL IF THE CONTACT IS MAINTAINED. THE USER IS THEN RESPONSIBLE FOR LIFT OPERATION AND ANY SUBSEQUENT DAMAGES. USE WITH EXTREME CAUTION.**

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 26 of 28	Rev 19

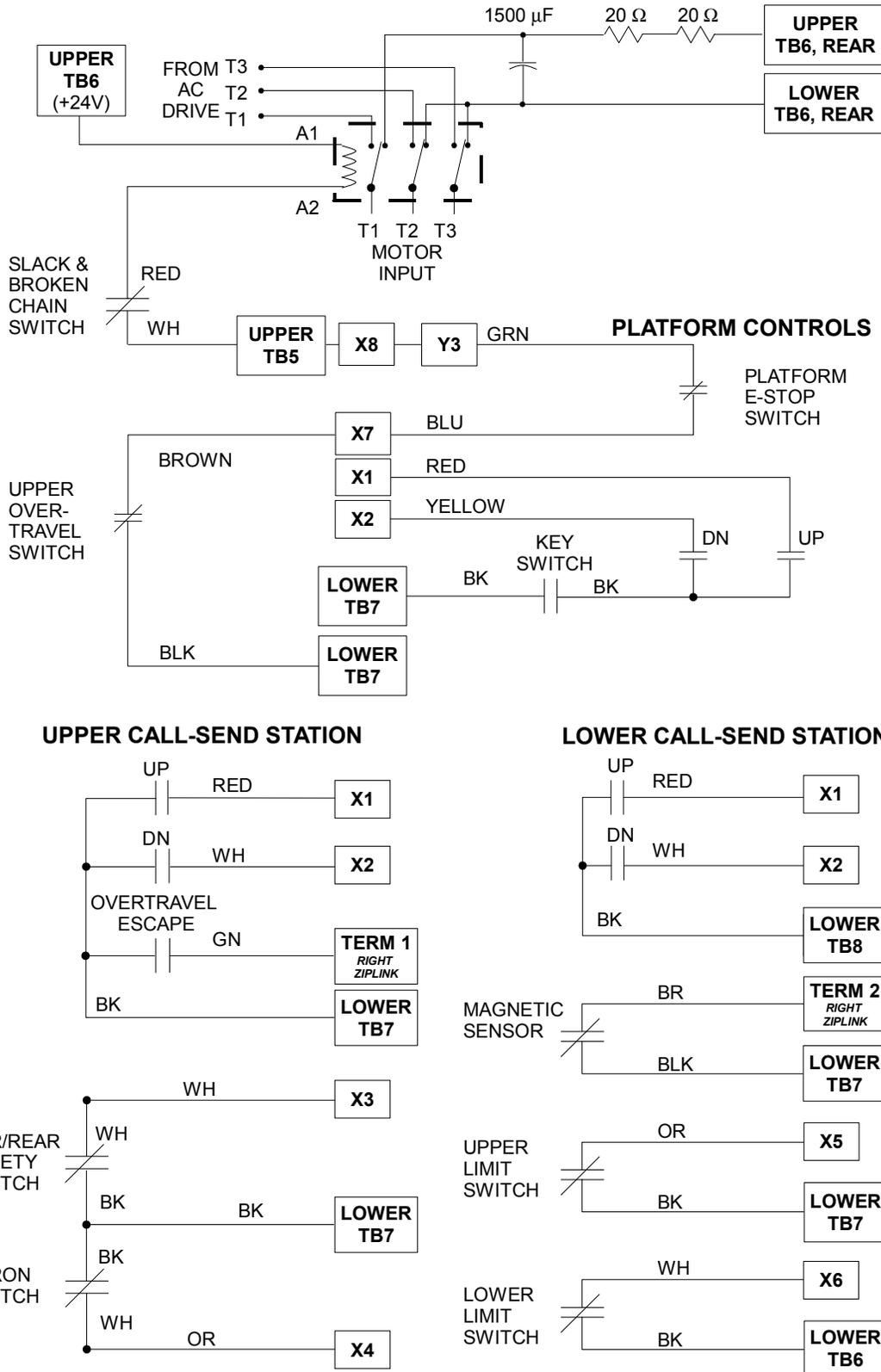


Figure 20: Functional Wiring Diagram

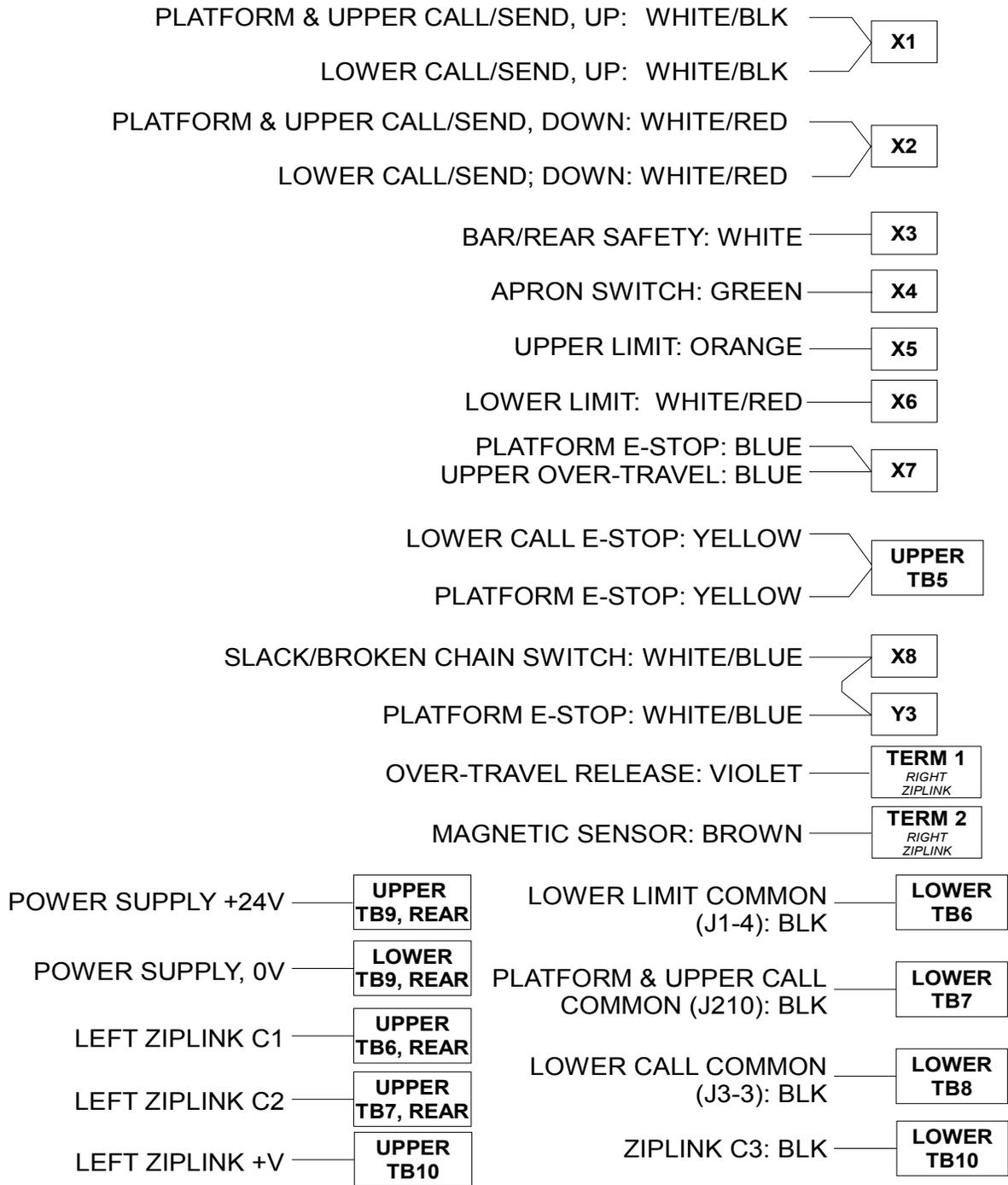


Figure 21: Power Unit Wiring Diagram

Butler Mobility IPL Installation Instructions	Document Number 22
	Date: 4 May, 2010
Page 28 of 28	Rev 19