

MAXFLIGHT EH-(Electric/Hydraulic)

MACHINES MANUAL

FS-VC Dual System

FS-3000 Flight Simulator

VR-2002 Roller Coaster

VS-4000 Mini-Sub Simulator

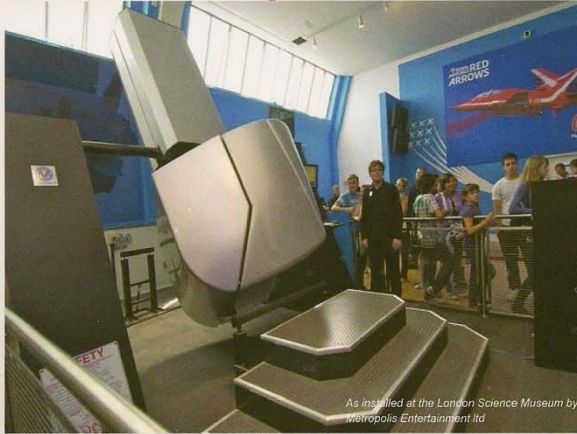


MAXFLIGHT

Interactive Ride Systems

FS-VC

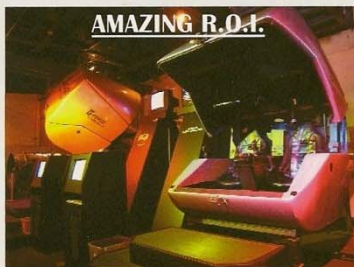
DUAL SYSTEM



MAXFLIGHT SIMULATORS NOW IN HD-3D!!!



- ♦ The Only 360 Degree Pitch & Roll Simulator in the World
- ♦ Fully Interactive—(Flight and Combat Sim)
- ♦ Dozens of MaxFlight Designed Roller Coaster Tracks
- ♦ Millions of Combinations of Customer Programmable Tracks
- ♦ New Edutainment Rides—Solar Coaster & Undersea Adventure
- ♦ In Business for 17 Years — Simulators in Over 40 Countries
- ♦ SOLID REVENUE (Great Re-Play Value)
- ♦ HIGH VOLUME
- ♦ HIGH IMPACT ATTRACTION
- ♦ SMALL FOOT PRINT
- ♦ EXCELLENT RETURN ON INVESTMENT
- ♦ More Installed Product than the Competition Combined



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MAXFLIGHT

Interactive Ride Systems

VR2002 Roller Coaster



DESIGN AND RIDE YOUR OWN ROLLER COASTER IN FULL MOTION!!

The VR 2002 Roller Coaster Simulator, a full motion, cockpit sized theme park, has succeeded in phenomenal fashion worldwide. Riders can program their own journey, selecting track pieces to create millions (literally) of “mild to wild” track combinations. Passengers then strap into the coaster cockpit and the full-motion 360 degree “forward-of-axis” action sends them soaring, spiraling, plunging and twisting in two different pulse-pounding directions. Every loop, leap and lunge is seen on the huge 1080P HD projection screen. Premium quality 5.1 surround sound and the feel of real wind in your face creates a true adrenaline rush.

Customers everywhere are drawn to the VR 2002 Roller Coaster’s “Compact Big Attraction” appeal and —like all MaxFlight simulators— operators can count on **large throughput**, a **small footprint**, **solid revenues** and an **excellent return on investment**.

10+ MAXFLIGHT DESIGNED TRACKS AVAILABLE TOO!

REPEAT BUSINESS



HIGH TURNOVER



FUN FOR ALL AGES



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MAXFLIGHT

Interactive Ride Systems



VS-4000

Mini-Sub Simulator



An Underwater HD-3D Adventure!!



Climb aboard the new **MaxFlight VS-4000 Mini-Sub** and hold on tight as you get to experience an all new HD-3D underwater adventure in full 360 degree pitch & roll motion! This ride will educate as well as entertain guests while they explore the mysterious depths of the Bermuda Triangle. Passengers will encounter sunken ship wrecks, missing scout planes from World War II and sea creatures that seem to jump right out of the screen!

The VS-4000's "Compact Big Attraction" appeal can help bring in amazing new revenue and foot traffic in a wide range of locations... Such as FEC's, museums and aquariums. Like all MaxFlight simulators, operators can count on large throughput, a small footprint, solid revenues and an excellent return on investment!!



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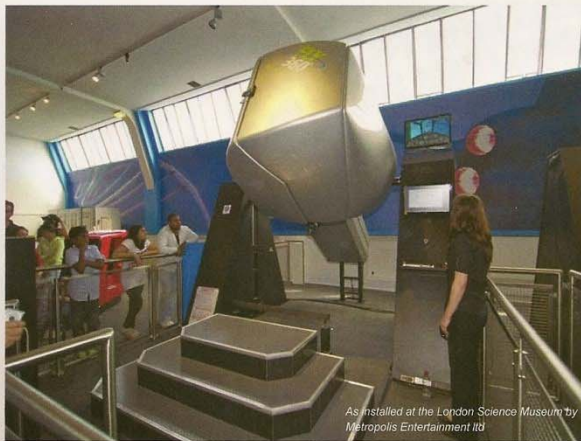
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MAXFLIGHT

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FS3000

FLIGHT SIMULATOR



MAXFLIGHT SIMULATORS NOW IN HD-3D!!!



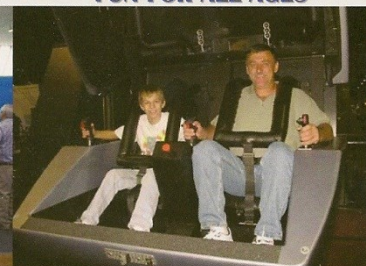
GET READY...our FS3000 Flight Simulators now feature ***High Definition 3D** visuals!! The air to air combat, stunt flying and carrier landings seem like the real thing with the amazing and true to life depth and clarity of our HD-3D projection and 5 speaker surround sound system. Combine this with our patented, fully interactive 360 degree pitch and roll technology...and you have the world's most exciting indoor attraction experience available for the entertainment market!

How does repeat business sound? This one of a kind, out-of-home entertainment experience is sure to keep kids and adults alike coming back to your facility to experience the multiple flight scenarios and dozens of different aircraft that come with this package. Bring in even more revenue by hosting dog fighting tournaments with multiple simulators networked together! Like all MaxFlight Simulators, the FS3000 carries the big guns of **solid revenue, high volume, small footprint and excellent return on investment.**

REPEAT BUSINESS

HIGH TURNOVER

FUN FOR ALL AGES



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*The FS3000 comes standard with a high definition projection system, paid upgrade required for a HD-3D capable simulator.

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Specifications for MaxFlight Interactive Ride Systems

Physical/Electrical Specifications;

Height Requirements	12 Feet 9 Inches (3.88 meters)
Width (Fenced)	12 Feet, 7 Inches (3.76 meters)
Length (Depth) (Fenced)	18Feet, 5 Inches (5.62 meters)
Floor Area	232.1 Sq. Feet (21.80 sq. meters)
Contact Feet	(2) 6 inches X 88 inches (15.24 cm X 223.52 cm)
Weight	5250 Lbs. total approx.
Static Floor Loading	22.61 lbs/sq. ft

Electrical Requirements;

US/North America	(1) 208 VAC 3 Phase, 60 HZ, 20 amp dedicated (2) 115 VAC, 20 amp dedicated
International	(1) 380/415/440/480 VAC 3 phase, 50/60Hz, 20 amps dedicated (2) 220/230 VAC, 50/60Hz, 20 amps dedicated

Note! Power at site used for the machine must be known when building the machine.
Inverters/motors must be matched at factory, they cannot be changed once shipped.

Note: MaxFlight simulators are not for outdoor use

CHAPTER 1 – INTRODUCTION

1-1 Introduction to the FS-VC DUAL SYSTEM

Welcome!! And thank you on your purchase of the FS-VC DUAL SYSTEM Flight Simulator. The FS-VC DUAL SYSTEM is the only full motion, interactive, networked experience of its kind. This is a dual seat combat fighter based on a virtual reality environment with a full 360 degree, 2 axis motion platform. The experience time can be varied according to patron demand; the standard time set is 5 minutes. The dual function is that you can also select roller coaster software and experience the dynamics of riding some of the best coasters designed, all in one place.

1-2 Overview of the FS-VC DUAL SYSTEM

The FS-VC DUAL SYSTEM is a computer driven flight simulator that provides a realistic aircraft combat and coaster environment. The customer can operate the flight simulator system as an amateur to gain experience and then progress up to a professional fighter ace. This system allows for the feel of actual flight without the strain of experiencing the damaging G-forces.

Or, just sit back and experience the excitement of riding a roller coaster.

1-3 Safety

Due to the nature of the FS-VC DUAL SYSTEM there are several safety precautions that must be observed in order to ensure the safety of both the patrons and the operators during the operation of this experience.

1-3A Operator Safety Requirements

Prior to assigning an operator, he/she must be trained and qualified to operate this ride. Documentation must be part of their personnel folder and available for public safety officials upon their request. A sample form is attached at the end of Chapter 3. This or a local equivalent must be used. Upon initial unit installation, the MaxFlight representative will train customer provided personnel, document training and provide a copy to the new owner/operator.

During the operation of the simulator, the operator must stay within the proximity of their assigned unit. Operators must watch for such things as equipment failure, abuse of the simulator and customers who wish to terminate game play. They must be assigned only one simulator/ride at any given time.

1-3B Loading/Unloading Safety

During the loading and unloading of patrons, the operator must ensure the simulator has come to a complete stop prior to lowering the unit and opening the cockpit canopy. The operator is required to assist the patrons negotiate the platform and cockpit

1-3C Queue Line Safety

The queue line must be kept orderly. The patrons must remain behind the established barriers while waiting their turn to fly. The queue line should also be used to familiarize patrons with the safe operation of their flight simulator as well as the game selections.

1-3D Canopy Operation

When opening the canopy, unlatch the safety cable then the top latch, rotate the locking knob, open the latch and allow the canopy to rise under its own power. DO NOT force the canopy up, this may damage the lift struts.

1. Ensure that the cockpit has completed movement prior to continuing with any other procedures.
2. Ensure that during any time the electric power is enabled, people stay clear of the simulator to prevent injury due to the possible movement of the simulator.
3. Ensure that operating personnel do not operate the simulator with any of the cover plates removed.
4. Ensure that only authorized personnel open the electrical power box for any reason.
5. Ensure that patrons pass the age, height and weight requirements to operate/ride the simulator safely.

CHAPTER 2 – OPERATION

2-1 Description of Motion During Operation

There are three basic axes of motion that the simulator travels on, Pitch, Roll and vertical lift into the game position. When used in accordance with the procedures outlined in this chapter, the FS-VC DUAL SYSTEM Flight Simulator/Roller Coaster will provide hours of trouble free operation.

2-1A Roll Axis

The roll motor is a 3HP 208/220/380/415/440/480 3 phase VAC drive motor controlled by a frequency drive inverter. The roll axis will rotate the cockpit in either a clockwise or counterclockwise direction, when facing the machine. The maximum velocity the roll axis will produce is 110 degrees per second.

2-1B Pitch Axis

The pitch motor is a 5 HP 208/220/380/415/440/480 3 phase VAC drive motor, controlled by a frequency drive inverter. The pitch axis will rotate the cockpit in either upwards or downwards direction standing in front of the machine. The maximum velocity the pitch axis will produce is 90 degrees per second.

2-1C Vertical Lift System

The hydraulic lift system is powered by a self-contained hydraulic power pack, located right inside lower A-frame. Motor is 1.5 HP single phase 115/220VAC. Lowering solenoid is located on top of pump pack. This solenoid is powered by the battery backup system power. This allows lowering the unit to egress passengers without building power.

2-2 System Startup Procedures

The procedures listed below must be followed to ensure the simulator operates in a safe condition.

1. Turn on power to the battery backup, lower rear right “A” frame by pressing in power button till unit beeps and NORMAL stays on.
2. Turn A-frame power ON, on side of operator station place finger through hole and press the power button on the power strip.
3. Open curtain on left side, press power ON button on motion computer.
4. Turn ON the operator station monitor power. Push the power button if not already on.
5. Turn ON the cockpit projector by pointing the remote to middle bottom of projector, press power button once, look on screen and verify projector comes on.
6. Go to rear of the on-board computer and press the RED button once, verify fans are running.
7. Use remote and turn TV power ON.
8. Right click on red “M” G2E motion icon on desktop, select OPEN and allow window to open fully.
 - a. Down/Lowered sensor light on green
 - b. Demo sensor light may be on
 - c. Brake Release sensor light is ON green
 - d. Top left inverter lights should be flashing red
 - e. Canopy open sensor light on RED
 - f. E-stop may be ON red if shoulder restraints are up.
 - g. Information window should show yellow with Instructions.
9. Pull out the red E-stop button below monitor. Turns ON the 3 phase power. The inverter lights on top of the program should now be flashing GREEN.
10. Minimize the program window by clicking on (-) icon top right of window. The program red “M” will show on task bar lower right. This program must always be open to get motion on simulator.
11. Right click on red “C” command icon on desktop, select OPEN and allow to open fully. Motion computer will query on-board computer for ride information and fill in top row windows.
12. Click on the VIDEO MOTION icon top row
13. Select a coaster track RIGHT SIDE by clicking on any, coaster selected will show at left side of screen, words will go dim until fully loaded, then comes back on in dark letters
14. TV should show a coaster video with words MAXFLIGHT when program is ready.

15. Buckle any all seatbelts if needed, buckle shoulder restraints if needed.
16. Close and lock cockpit, install safety cable on front latch.
17. On operator control panel you should now have RAISE icon available, click on "RAISE" icon.
18. Unit will raise a short distance, Stop to balance then continue up to the top
19. When at the top, START icon comes ON dark
20. Click on START, unit will start the coaster program selected, coaster program will show video on TV screen, timer on left side will count down.
21. Allow ride to finish, time counter will show 000, machine comes to home level position and LOWER icon comes back on.
22. Click on LOWER icon, unit will come down to front and rear support stands 23. Open the cockpit and get machine ready for customers.
 - a. Unlatch shoulder restraint belts.
 - b. Unlatch seat belts.

2-3 Loading Customers

1. Have customers remove any/all loose items on their person and place them in the baskets provided.
2. Help customers step into cockpit.
3. Have customer/s place seatbelt on and latch same. Verify straps are snug on their lower body.

NOTE! On smaller children, verify they are seated all the way back against backrest, then check to see if seat belt is snug.

4. Lower and latch shoulder restraints with crotch belts, pull snug onto customer's laps.
5. Explain function of red e-stop switch located inside the cockpit.
6. Close and latch cockpit and install safety cable to latch handle.
7. Go to operator station, select coaster track desired by customer, and allow to load.
8. Click RAISE, and allow unit to balance and rise to the top.
9. Click START icon when on dark, machine will go into full motion following coaster video playing on the TV.
10. When timer is 000, program ends, LOWER icon comes on
11. Verify unit is level in pitch and roll, Click **LOWER** icon, allow machine to come fully down before opening the front latch and safety cable
12. Open cockpit.
13. Unlatch crotch belts and allow shoulder restraints to go up.
14. Have customer unbuckle seat belts.
15. Help customers exit the simulator.
16. Pull buckles on crotch belts backwards and lay on floor.
17. Re-load new customers and repeat above instructions.

2-4 Description of Passenger Restraint System

There are two restraint systems employed for passenger comfort and safety, a primary and a secondary.

2-4A Primary Restraint

The primary restraint system is similar to an airline safety belt. It simply pulls around the passengers lap and plugs into the receptacle. It is then tightened by pulling end of the strap. The operator must verify that the seat belt is fastened and snug on customer. The belt is over center type and cannot be inadvertently released.

2-4B Secondary Restraint

The secondary restraint system consists of a molded structural steel bar shaped to fit the passenger. The bars are covered with padding and vinyl covers for passenger comfort. Once lowered into place, the passengers must not release themselves.

If they release the crotch belt buckle, the shoulder restraint will raise up, the safety switch will activate and the machine will stop and turn on a yellow caution on the operator panel.

NOTE! If restraint was released in flight the operator option will be same as if an e-stop was pressed inside by a customer to stop the ride. To get the unit lowered the operator must first click on “Stop” icon. This will enable the “Lower” icon so operator can normally lower the ride. Verify machine level before lowering.

To operate, lower the harness to the patrons comfort, close and latch buckle. Before closing the cockpit again check it for security and that it is locked.

2-5 Height and Weight

Maximum 2 people for a total weight for the ride of 500 lbs. (226.8kg). Minimum height requirement for the ride is 48 in. (1.22 m) to ride alone or 42” (1.07m) if accompanied by a responsible adult.

2-6 Customer Pockets

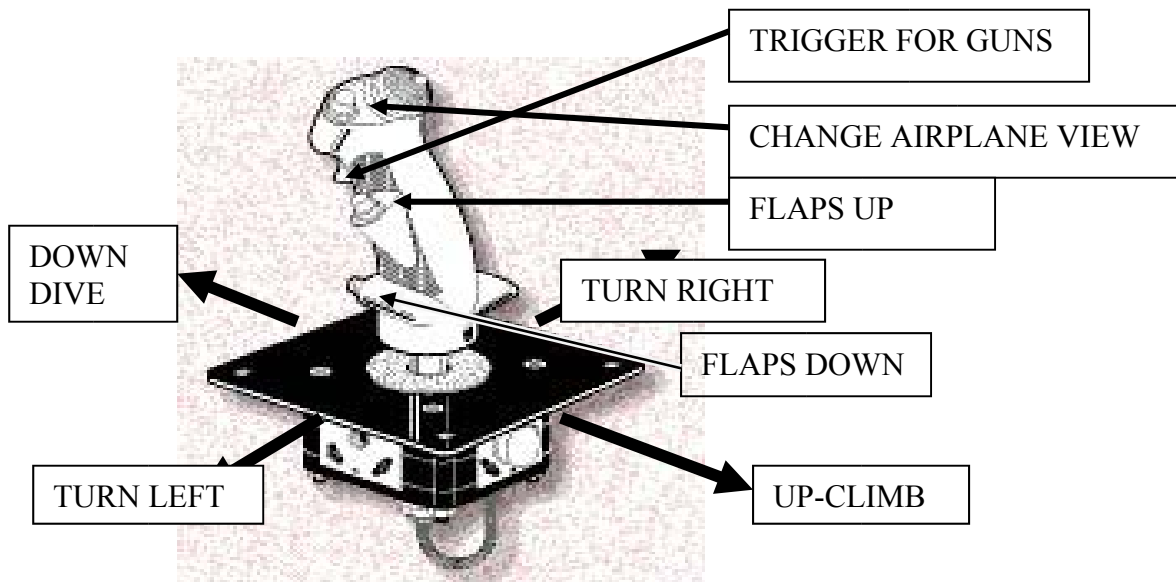
To prevent personal injuries to patrons, the attendant **must** ask each patron if they have any objects in their pockets that could come out during the ride. If so, remove and place the items in a secure container for the duration of the ride. Be sure to remind patrons at the end of their ride to retrieve their possessions.

2-7 Flight Control Stick Operation

While the game is in progress, the flight control stick (right controller) will operate the direction that the simulator will move. Moving the controller to the right will cause a roll to the right. Moving the controller to the left will cause a roll to the left. To pitch the unit up, pull the controller back and to pitch the unit down, push the controller down.

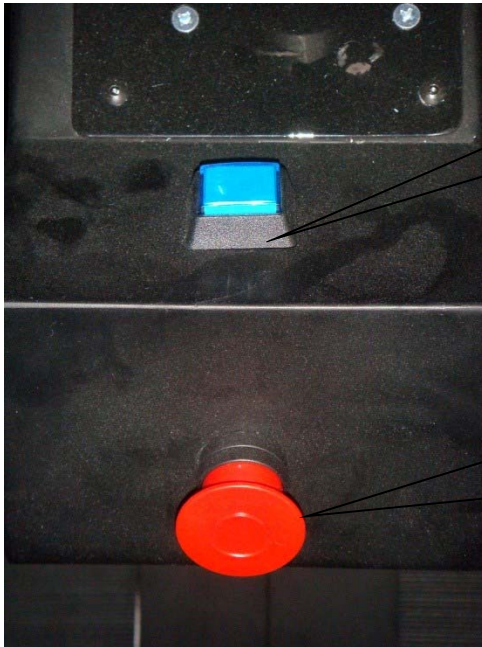
NOTE: There are two joysticks and two throttles on this ride. Either one will start as the “PILOT”. The other joystick starts the ride as the “GUNNER”. These functions can be switched by pressing the TOP GREEN BUTTON on center top front of console. It can also be changed back again by pressing the button once more.

JOYSTICK MOVEMENT FOR “PILOT”



NOTE! Moving the Joystick in the direction of the designated arrows makes the machine/platform move in that direction

2-8 Patron E- Stop Button

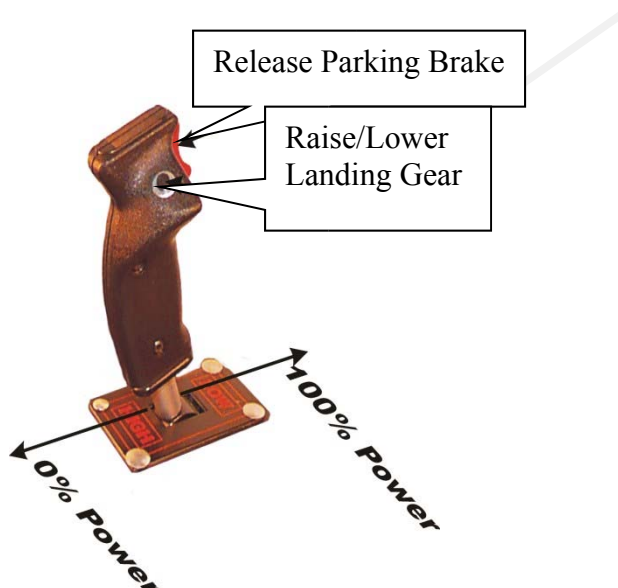


Blue button used to transfer control of who is flying the unit

RED button on front center of console, if pressed in, will STOP all motion, return cockpit to home level position. Operator action will be required to lower unit.

2-9 Throttle Control Stick

The throttle control stick controls the speed of the aircraft. Pushing the throttle forward increases the speed of the flight and pulling the stick back will decrease the speed. Depressing the trigger will release/set the brake. Pressing the top button lower/raise the landing gear.



Release Parking Brake

Raise/Lower Landing Gear

0% Power

100% Power

2-10 Game Start Procedures

2-10A Initial Game Startup for Coaster Program/s

1. To start a program click on big icons on the control panel window for correct program legend you are about to run. Select a coaster from the drop down files to the right. The on-board will load the selected program and cycle through all settings required.
2. When program is ready the “On-Board Dispatch Status window” will state Coaster (name) loaded and ready.
3. The files on right side will come back dark and MaxFlight logo be on the TV screen.
4. Load passengers
5. Verify seat belts and shoulder restraints are closed and fastened.
6. Explain use of patron e-stop push button.
7. Click on “Raise” machine goes to balance then goes on to the top. G2E status will change to “Running” when machine is safe and up sensors are closed. System Control icons “**Stop**”, “**Start**”, and “**Pause**” will come on dark. Lower icon will remain on until you click on “Start” to run the game.
8. Click on “**Start**”, game video plays on TV, machine follows the motion. Lower icon goes out.
9. When timer times out, system controls Raise and Start go away and “**Lower**” icon comes back ON.
10. Click lower and machine will lower to support stands.
11. Open cockpit, release restraints and allow people to exit.
12. Load new patrons and repeat above procedure at step 1.

2-10B Initial Game Startup for Combat Flight Sim 2 Program

1. To start a program click on big icons on the control panel window for correct program legend you are about to run. Select an aircraft from drop down files to the right. The onboard will load CFS2 program and cycle through all settings required.
2. When program is ready the “On-Board Dispatch Status window” will state CFS2 is ready.
3. The files on right side will come back dark and airplane cockpit will be visible on the TV.
4. Load passengers
5. Verify seat belts and shoulder restraints are closed and fastened.
6. Explain controls and show location of panic e-stop push button.
7. Close and latch cockpit, G2E motion status will change to “Home”
8. Click on “Raise” machine goes to balance then goes on to the top. G2E status will change to “Running” when machine is safe and up sensors are closed. System Control icons “Stop”, “Start”, and “Pause” will come on dark. Lower icon will remain on until you click on “Start” to run the game.
9. Click on “Start” and patrons now have control of the motion from inside. Lower icon goes out.
10. When timer times out, system controls Raise and Start go away and “Lower” icon comes back ON.
11. Click lower and machine will lower to support stands.
12. Open cockpit, release restraints and allow people to exit.
13. Load new patrons and repeat above procedure at step 1.

2-10C Initial Game Startup for Flight Sim X Program

1. To start a program click on big icons on the control panel window for correct program legend you are about to run. Select an aircraft from drop down files to the right. The onboard will load Flight Sim X program and cycle through all settings required.
2. When program is ready the “On-Board Dispatch Status window” will state Flight Sim X is ready.
3. The files on right side will come back dark and airplane cockpit will be visible on the TV.
4. Load passengers
5. Verify seat belts and shoulder restraints are closed and fastened.
6. Explain the use of the flight controls.
7. Show location of panic e-stop push button and how to use it.
8. Explain use of green pilot transfer button on top front of center console.
9. Close and latch cockpit, G2E motion status will change to “Home”
10. Click on **“Raise”** machine goes to balance then goes on to the top. G2E status will change to “Running” when machine is safe and up sensors are closed. System Control icons **“Stop”**, **“Start”**, and **“Pause”** will come on dark. Lower icon will remain on until you click on “Start” to run the game.
11. Click on **“Start”** and patrons now have control of the motion from inside. Lower icon goes out.
12. When timer times out, unit will return to home level position and stop. System controls Raise and Start go away and **“Lower”** icon comes back ON.
13. Click **“Lower”** and machine will lower to support stands.
14. Open cockpit, release restraints and allow people to exit.
15. Load new patrons and repeat above procedure at step 1.

2-10D How to make Programmable Coaster Track

1. Click on kiosk window using touch pad on front of kiosk
2. Type a name using the touch pad by clicking on the letters there
3. When you have the name, click on NEXT
4. Click on the coaster window in center, another window opens showing different tracks
5. You can select up to nine (9) tracks
6. Click on DONE when finished, the ride you just made goes to the operators control panel when PROGRAMMED VIDEO ICON is selected.

2-10E Raising the Unit

Ensure that power is applied and normal program is loaded. Go to the LIFT CONTROL, click on the **“RAISE”** icon. The unit will come up about 1.75 to 3.0 inches, stops to balance. Upon completion of balancing, the unit will continue raising up to the upper limit switches. **If the unit does not balance within 65 seconds**, the unit will lower to down stops, you must open the cockpit and be politically correct when trying to change weight of patrons.

NOTE: The weight limit is 500 pounds.

2-10F Game Start

Game will only start when normally raised to the top after a game is selected. When the platform reaches the upper limit switches the CPU will enable the program and full motion is enabled. Click Start.

2-11 Game Over

When the time runs out, the game window timer will be zero. During this time the unit will return to “**HOME POSITION**”. After unit has stopped moving, the **LOWER**” icon comes on, click on the “**LOWER**” icon. This will lower the unit to the support. Once all movement has stopped, open the cockpit and discharge the patrons.

2-12 System Shutdown

At the end of the operating day, follow these procedures to ensure that the simulator is safely secured for the day.

2-12A TURNING KIOSK OFF AT END OF DAY. (Optional only for those that have one)

1. If any program is running;
 - a. On operator desktop, r-click VNC icon,
 - b. Select the IP address for Kiosk, click OK
 - c. When kiosk window shows on monitor locate the SA12-XX-XXX bottom of task bar
 - d. R-click on the SA12-XX-XXX and select SEND CONTROL, ALT, DELETE
 - e. Click on Program running, select END, program shuts down
 - f. Click and hold click on side slide bar, drag down till you see the START on task bar
 - g. Click START, then SHUTDOWN, then SHUTDOWN
 - h. Computer is shut down

2-12B SHUTTING DOWN THE MACHINE AT END OF DAY

1. Using the keyboard press ALT and ENTER at the same time, this shuts down the coaster or flight sim program on the on-board computer.
2. Press IN the red E-Stop button below the monitor, this removes all power to the motors.
3. Use projector remote, point to middle bottom of projector, double press the power button, projector light turns OFF. Allow projector to cool down @3-5 minutes. Continue on while projector is cooling.

NOTE! On some projector remotes you have a power OFF button, use it if available to turn projector off.

4. R-Click on VNC icon select on-board computer IP address, click on CONNECT, on board desktop now shows on the screen. Should programs still be running, shut them down using the following steps:
 - a. R-click on onboard serial number icon on task bar.
 - b. Select “Send Control, Alt and Delete”
 - c. On on-board task manager, click “Applications” tab
 - d. Click on program listed and then click “End” at bottom.
 - e. After programs are shut down and desktop is visible continue.
5. Click START icon lower left side, then click on SHUTDOWN.
6. Verify kiosk computer is shut down.
7. Shut motion computer OFF, click START, then SHUTDOWN then SHUTDOWN
8. Turn the A frame power strip OFF, by going through hole on side of A frame and pressing the power switch in.
9. Go turn OFF power on Battery Backup, press hold power button till it beeps, then release button.
10. Close all seat belts and put belts on shoulder harness
11. Place remote controls on top of motion computer.
12. Close curtain.
13. Machine is now secure

2-13 Emergency Stop Procedures

In the event of an emergency follow the procedures described below for the type of emergency.

2-13A Occupant: Using the Panic Switch located inside cockpit

NOTE! When activated, a red dot light on top and a yellow window will appear on right side of motion control program window, or a yellow window in operator control window with legend stating what the issue is.

During the ride the patrons have the ability to initiate a ride abort by depressing the **Occupant Panic Switch**. The Switch is located between patrons on front of the center console. When this switch is depressed the ride will return to the “**home**” position, the video projector will freeze and the sound will stop. On the operators panel they will get the information block to turn yellow stating what happened. Operator must click on **STOP** icon top center on operator screen, then the **LOWER** icon comes on. Once the unit is verified level, lower the unit by clicking the “**lower**” icon on the computer screen. After the unit is completely lowered onto the stairway, open the cockpit door, discharge the passenger following the Passenger Unloading Procedure.

2-13B Emergency Termination Procedures: Fire Alarms, Bomb Threats etc.

In the event of an emergency not involving the simulator directly, click on the ‘**STOP**’ icon on the screen. Wait for the unit to level, and then lower the platform as normal. Open the cockpit, get patrons out and point them to nearest exit. Prior to leaving unit press in the **EMERGENCY STOP BUTTON**, located under the monitor. Leave the area as directed.

NOTE! In the event that the unit is not responding to the normal commands, use the Red **EMERGENCY STOP BUTTON** under the monitor, press it in. Bring the unit manually to the home level position. On rear right A-frame open the emergency control panel. Press and hold the LOWER button till machine is completely down. Open the cockpit and evacuate patrons safely and quickly as possible.

2-13C Emergency Stop without Electrical Power

1. The **Red EMERGENCY STOP BUTTON** under the monitor must be depressed/**pushed in IMMEDIATELY**; this will keep the electric motors disabled and applies the motor brakes.
2. Level the unit in both the pitch and roll axis manually.
3. Using the manual LOWER SWITCH on the back of the right A-frame, press and hold button till unit is completely down.
4. Open cockpit and evacuate the patrons.
5. Have technicians recertify unit before normal operations begin again.

2-14 Power Interruptions and Restart Procedures

Should facility power be interrupted, the following procedures must be followed.

1. Push in red e stop, Level and lower unit as described in above paragraphs.
2. Have your technician inspect and power up unit as you would at beginning of the day. This will guarantee that everything functions normal and computers are at default program start status.

2-15 Ride and Facility Evacuation Procedure

Terminate the ride from the computer. Quietly and calmly, have the queue line begin exiting the facility.

Lower the unit(s) open and unbuckle all patrons and assist with the evacuation of the facility.

Follow the system shut down procedure if time permits press the “**E-Stop**” this removes power to the electric motors.

NOTE: It is most important that the power to the motors be disabled prior to leaving the area.

2-16 Ride Termination Conditions

1. Any abnormal vibration or abrupt motion changes that would not be considered part of the normal operation.
2. Any undue movement of either the fiberglass, covering panels, A-frames or any hinges or fabricated metal that would indicate fatigue, fracture or loose bolts.
3. Any type of electrical problem that would affect continuation of the game and could include electrical problems within the building that could inadvertently affect the operation of the simulator.
4. Any computer malfunction that would include system lock-up, program termination or any other condition that would affect game play.
5. Any condition with the movement that is abnormal (i.e. the TV set showing a roll where the simulator remains stationary).
6. Any loose objects that roll around inside the cockpit as these items would damage the patron as well as the components inside the cockpit.
7. Any signs that the unit base is moving on the floor.
8. Any signs of smoke or sparks which would indicate the potential for fire.
9. Any condition where the passenger was tampering with the system such as pounding on the fiberglass or undue pressure on the cockpit.

2-17 Operational Restrictions

There are certain conditions that the machines should not be operated under. These conditions are described below.

2-17A Intoxication

If a patron is under the influence of any drugs or alcohol they should not be allowed to utilize the equipment.

2-17B Heart Conditions

Any heart or other similar condition would preclude a passenger from riding the simulator.

2-17C Pregnancy

It is not recommended that women who are pregnant ride the simulator.

2-17D Weight and Height Restrictions

The patrons must be at least 42” (1.07 m) tall to ride with a responsible adult or, 48” (1.22m) tall to ride alone. Total weight of riding patrons is not to exceed 500 lb. (226.8kg).

2-17E Electrical Storms

It is up to the discretion of the owner operator to operate during an electrical storm. However, it is NOT recommended to rely on the internal facility safe guards to protect the equipment. When in doubt, shut down the system to ensure safety of not only the passengers but also the safety of the system.

2-18 Daily Inspection Checklist Description

The Daily Checklist is to be completed by the first shift attendant operating the FS-VC DUAL SYSTEM as well as the second shift attendant (if applicable) at the beginning of his/her shift. These sheets should be filled out on a daily basis. DO NOT check off the items in the checklist unless you have performed the required inspection. This maintenance is required to maintain optimum performance of the FS-VC DUAL SYSTEM. The master copy of this checklist can be found on PG 71.

CHAPTER 3 – SUGGESTED POSTINGS and Manufacturer's Specifications

3-1 Manufacturer's Specifications

Reference Standard:

ASTM-F24 Standards on Amusement Rides and Devices

1. F770 Practice for Operation Procedures for Amusement Rides and Devices
2. F853 Maintenance Procedures for Amusement Rides and Devices
3. F893 Inspection of Amusement Rides and Devices
4. F1159 Design and Manufacture of Amusement Rides and devices
5. NEC 1996 National Electrical Code

MaxFlight, Corp., at the time of the initial design and prototype manufacture, determines by calculations and testing the appropriateness of the functional design criteria. The visual esthetics of the ride are also evaluated and together with the functional design criteria make up the manufacturer's design specifications.

These design specifications are adhered to on all subsequently produced rides of the same style. Occasionally, through field experience, it becomes necessary to specify a modification to the original design specifications.

Actual modification to meet the change in design specifications can only be performed by qualified personnel, following the directives of a MaxFlight, Corp. Service Bulletin, Service Kit, or a MaxFlight, Corp. representative, where applicable.

Any modification performed on a MaxFlight, Corp. product outside the recommended directives established by MaxFlight, Corp. as referenced above, constitutes an unauthorized modification. MaxFlight, Corp. specifically disclaims any liability for loss associated with any unauthorized alteration and/or modification to any of its products.

MaxFlight Corp. will not issue letters for the operation of rides which do not meet the manufacturing specifications; this includes cases where the non-conforming modifications of an aesthetic nature only.

In case where owner/operator desires to change paint scheme of cabin, prior written approval from MaxFlight is required.

It is the responsibility of the individual inspector to thoroughly inspect the ride as deemed necessary, based on his knowledge and field experience to determine that the ride meets the manufacturers and/or is safe for operation.

Information for our rides, can be obtained by calling Tech Support at MaxFlight Corp. during normal business hours 8:30AM to 5PM eastern standard time, at 1-732-281-2007 Ext 235. Tech information, safety bulletins and manuals can also be viewed on our website at www.maxflight.com

3-2 *Suggested Postings*

This chapter also contains notices that we suggest be placed near the unit to promote the safety of patrons as well as operators and to ensure proper operation of the ride.

EMERGENCY PROCEDURE POSTINGS

Emergency Stop Procedure

The **Red Emergency Stop Button**, located on the command console, **MUST be depressed IMMEDIATELY**. This will deactivate the Electric Motors. The unit will need to be leveled manually on both the Pitch and Roll axes. Located on the back of the right A Frame open the emergency operating panel, depress the LOWER switch and hold till unit is completely lowered to support stands. Open the canopy, raise the harness restraints and aide the patrons in exiting if necessary.

Ride and Facility Evacuation Procedure

1. Terminate Game Play from the host PC.
2. Quietly and calmly, have the Queue line begin exiting the facility.
3. Lower the unit.
4. Open the canopy, raise the harness(s) and unbuckle the patron(s), point them to evacuation exits.
5. Press E-Stop in under the monitor.
6. Assist with the evacuation of the facility.

NEW EMERGENCY LOWER PROCEDURES

EH ELECTRIC MACHINES ONLY

Facility power not necessary in order to lower the unit in an emergency. Lower valve has battery backup.

Open the cover to the emergency control panel, located right rear of A-frame.

Manually level the pitch and roll axis by releasing manual brakes.

Press and hold the “lower” switch to achieve the desired down position of the unit. Release the switch.

To raise unit with power available use raise button on rear of right a frame cover.



PATRON NOTICE

Maximum Passengers Per Ride: 2

Maximum Combined Weight: 500 lbs. / 226.8 kg

Minimum Height Per Passenger:

42 inches (1.07m) with a responsible adult

48 inches (1.22m) when riding alone

This ride is **NOT RECOMMENDED** for persons who:

- Are under the influence of alcohol or any type of drugs.
- Are pregnant.
- Suffer from Motion Sickness or Claustrophobia.
- Anyone having Heart Conditions, Back or Neck Ailments or any Serious Disabilities.
- Epileptic patrons; due to the special strobe and lighting effects that are known to trigger seizures

All loose articles such as pens, loose change, cell phones, ipods etc. that may come off during flight should be removed.

- Patrons have a responsibility to exercise good judgement and act in a responsible manner while riding the FS-VC DUAL SYSTEM.
- Patrons have a responsibility to become familiar with and obey all oral and written warnings and instructions prior to and during their use of the FS-VC DUAL SYSTEM simulator.

The MaxFlight FS-VC DUAL SYSTEM is intended for the enjoyment of patrons and the above information is for your safety and well-being.

Warning Sign Posted at Entrance

Where a major ride exposes a passenger to high speed, substantial centrifugal force or a high degree of excitement, the **owner/operator** shall post a conspicuous warning sign at the entrance to the ride advising the public of the risk to passengers.

The sign required shall be of sharply contrasting colors and shall be legible to a person of normal vision standing at the point of entrance to the ride.

When making the sign, try and use international recognizable symbols as much as possible for verbiage and drawings.

The sign required shall read as follows or express equivalent warning:

The following people should not use this ride:

1. Those who are pregnant
2. Those with heart condition
3. Those with serious back problems
4. Those subject to motion sickness
5. Those subject to claustrophobia (fear of confined spaces)
6. Those with serious health problems or serious physical disabilities
7. Those under the influence of alcohol or drugs
8. Those person/s with casts on either arms or legs that could injure fellow passengers

The sign should also include a statement:

State law requires that each rider must obey all written warnings and directions regarding this ride and refrain from behaving in a reckless manner which may cause or contribute to injury of the rider or others. Failure to comply may be a violation of law and subject to penalty.

The sign must also state MaxFlight Corp. height requirements, number of riders and weight limitations as listed in “Patron Notice”

No passenger under 48” shall ride by themselves without being escorted by a responsible adult. Responsible adult must ride with them.

APPENDIX A – SITE CONFIGURATION REQUIREMENTS

To determine the site configuration, there are several factors that need careful attention.

1 - Available Floor Space

Each unit has a footprint of 12' 7" (3.76 m) wide by 18' 5" (5.62 m) deep, including the loading platform. Depending on the site topography, the actual configuration will vary.

2 - Ceiling Clearances

The ceiling height requirement is 12' 9" (3.9 m)

3 - Floor Loading Capabilities

Floors must be able to support the weight of the units. To obtain this information, consult an engineer or an architect.

Approximate Unit Weight – 5250lbs (2381 kg)

Load Distribution per Square Foot – 22.58 lbs. /sq. ft.

4 - Aisle Clearance

Consult local building codes. A minimum of 6' (1.83 m) is recommended, but should not supersede the local building codes.

5 - Entrances & Exits

Egress routes must be clear and unobstructed. Local building codes will dictate.

6 - Environment

Keep facility operating temperature reasonably stable. Temperatures less than 80 degrees Fahrenheit with humidity levels less than 60% would keep patrons comfortable and keep equipment functioning well. Also, for the best visual effect, facility lighting should be kept low.

Warning – If the environment is not stable it may cause damage to the electronic equipment.

7 - Floor Finishes

A carpeted floor is the preferred floor finish. Tiled floors and bare concrete floors are okay but may require placing the machine on an anti-slip pad.

8 - Truck Routes

Depending on the size of the purchase, there could be a need to have access to the facility capable of accommodating large freight trucks, which require maneuvering room.

9 - Docking

Obtain and forward dock heights before shipping arrangements are made so that accommodations can be made for the ease of unloading.

10 - Freight Elevators

When installing units that are above the ground or dock level of your facility, examination of freight elevators for capacities, size and operability is necessary. Schedule time and operators for the day of delivery where applicable.

Technical Information and Maintenance

FS-VC Dual System
Fs3000 Flight Simulator
VR2002 Roller Coaster
VS-4000 Mini-Sub Simulator



CHAPTER 1 – THEORY OF OPERATION

1-1 Introduction

To understand why certain steps have to be performed while running this motion simulator you should know how the unit does what it does. You also need to know how each part plays its part so when something should go wrong, it can be corrected with minimum down time.

NOTE: The Inverters must be matched at the factory to the power available in the field installation. The motors can be rewired for various inputs but the inverters cannot.

1-2 ELECTRICAL U.S.

1-2A Input Power: Two circuits of 115 VAC single phase, 20 amp 60 Hz for computer, blowers, projector, audio amplifiers and hydraulic motor.

One circuit of 208 VAC three phase, 20 amp for drive motors.

1-2B Power Box: Contains the following;



1. Power connection for frequency drive invertors.
Pitch
Roll
2. 12VDC power supply for relay control
3. Pump power, raise and lower control relays
4. Main power relay contactor and thermal overload protect
5. Receptacles for all connections

1-2C Electro Magnetic Interference (EMI)

EMI is a problem when you have high current wires laying parallel with low current/voltage wires. When the magnetic field about a wire changes, that change induces voltage spikes or signal interference into associated wires. If this becomes a problem there are ways to correct this.

One, is limiting induction on other wires by using shielded cables and connections. The other method is to space wires apart or run them ninety degrees to each other. In this system we use both methods to limit power interference into video, audio and control signal cabling.

1-2D Roll Axis



Center Weldment

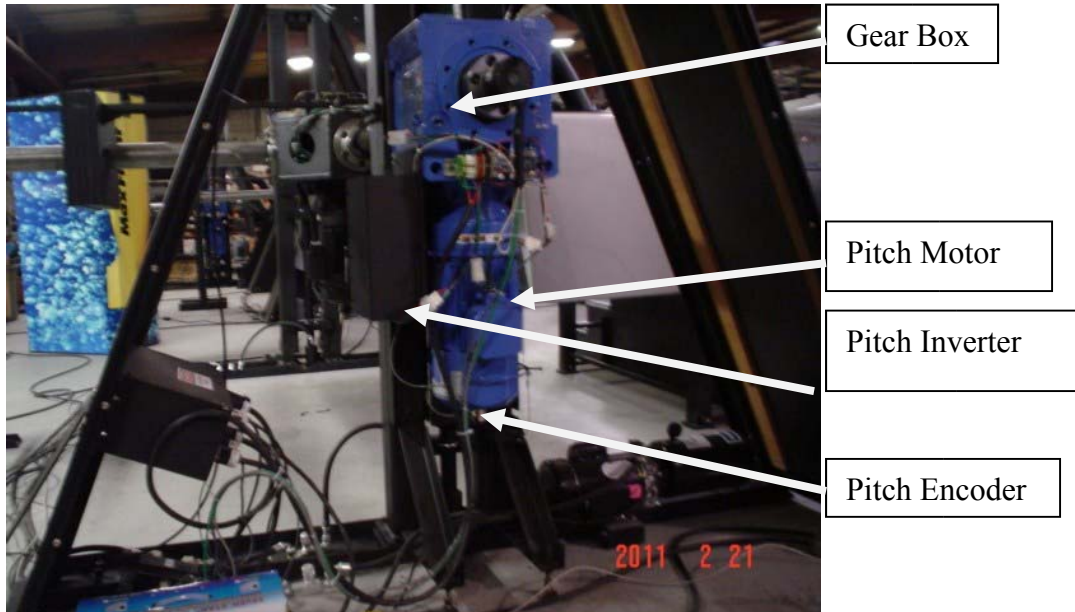
Roll-Brake
Solenoid and
manual brake
release lever

Roll Motor: Three phase AC motor and gear box. Mounted in the center weldment. Roll shaft and hub assembly gets mounted through the center of the gearbox held by a QD coupling. Gearbox pre-filled at factory.

Roll Brake: Mounted on the end of drive motor. Dynamic braking stops motor rotation and when brake power is removed to solenoid it holds the axis where last left. The brake solenoid power 220 VAC goes to a full wave rectifier inside the motor connection enclosure where it is converted to DC voltage. The brake solenoid coil operates with DC voltage from 181 to 220 VDC. It has a manual brake release lever, located at base of motor.

Roll Encoder: Is a 120 count encoder (480 in quadrature) mounted on the end of the roll motor shaft. Sends roll position of the platform back to the computer via the interface board and motion control board.

1-2E Pitch Axis

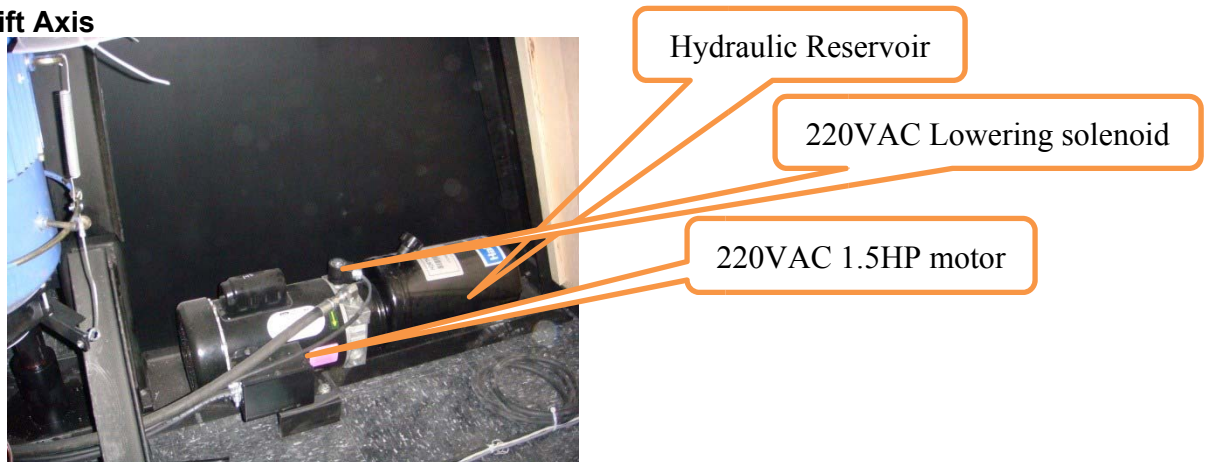


Pitch Motor: A motor gearbox combination mounted to the right pitch shaft. Physically moves unit in pitch axis. A QD coupling, mechanically transmits torque from motor to the shaft. Filled with gear lube at the buildup of the unit.

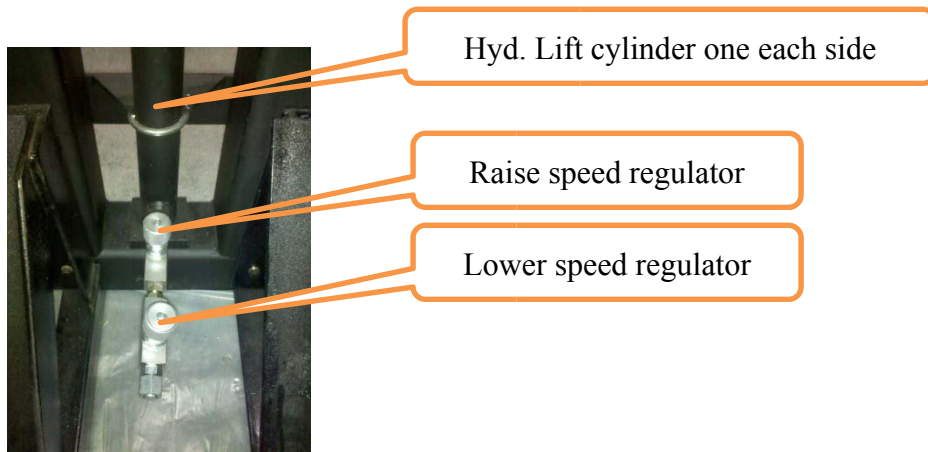
Pitch Brake: Mounted on the end of pitch drive motor integral to the unit. . It receives 220 VAC to the rectifier inside the enclosure. The coil is a 220 VDC unit. It has a manual release lever.

Pitch Encoder: Is a 120 line encoder mounted to the motor shaft. Sends pitch position to the computer via the interface board and motion control board.

1-2F Lift Axis



Hydraulic motor, reservoir and pump combination, located inside right A-frame area. Motor uses 220VAC to run, 115VAC or 220VAC solenoid depending on site electrical configuration.



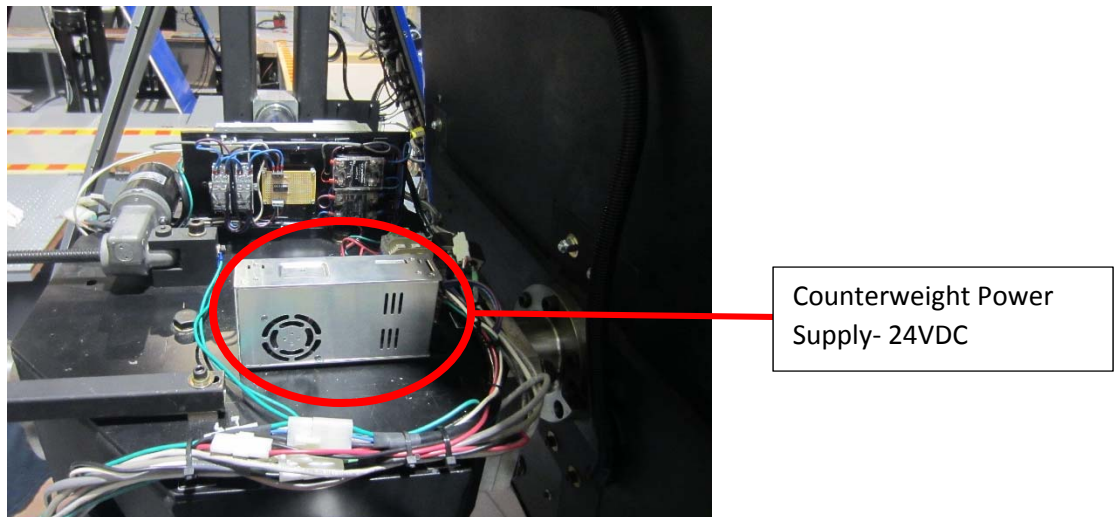
There are four flow control devices. One controls lowering speed the other two raise speed to each lift cylinder.

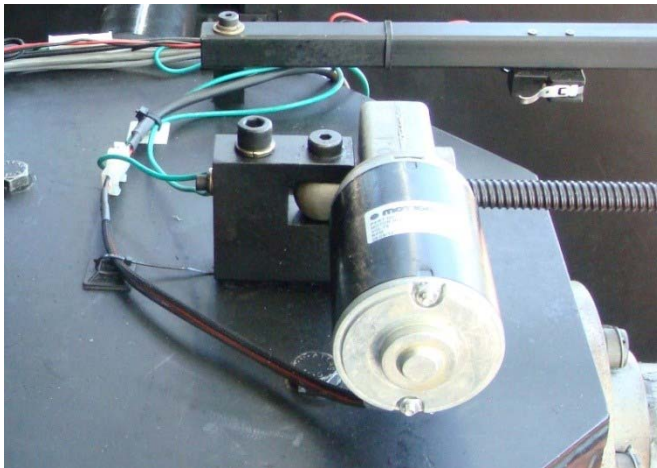
Lift pressure flows through a flow divider that controls equal flow to each cylinder. Lift pressure is @ 1100 PSI. Each lift ram has its own raise and lowering regulator, compensating for difference in weight on each side, allowing unit to raise and lower level.

1-2G Counterweight Drive System

Drive Motor/ /Gear box mounted on top of center weldment, attached to a horizontal drive screw and clutch that moves the counterweight in either direction as commanded by the CPU.

Motor is 24 VDC and controlled by CPU for direction

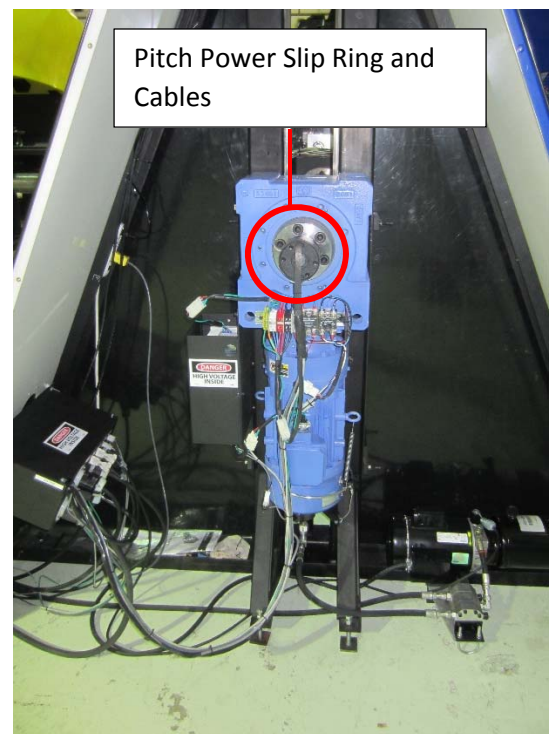
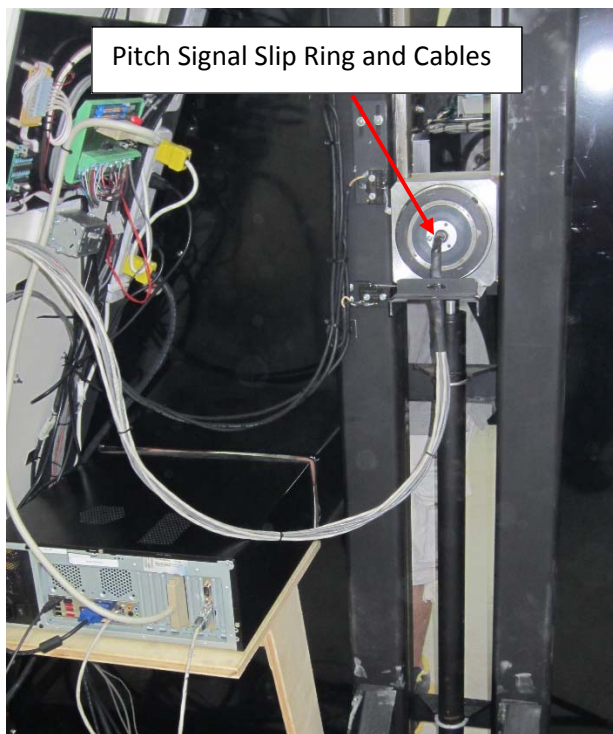




Counterweight drive motor and gear box. Operates on 24VDC and has a 10 to 1 ratio gear box coupled via rubber drive bushing. Braking of counterweight is achieved by relays supplying +24VDC to both sides of the motor.

1-2H Pitch Slip Rings

These units are sealed no maintenance required or allowed.



1-2I Blowers

1. 3.5" blower for the projector. 115VAC
2. 2- 4.5" blowers mounted at rear of cockpit for ventilation. 115 VAC

1-2J Power Strips

Two located inside A-frame left side operator station. Two located under seats of cockpit area.

1-2K Sensors

One left upper limit sensor, one right upper limit sensor, one lower limit (down) sensor, one canopy sensor and one demo switch sensor. Brake release sensor.

1-2L Switches

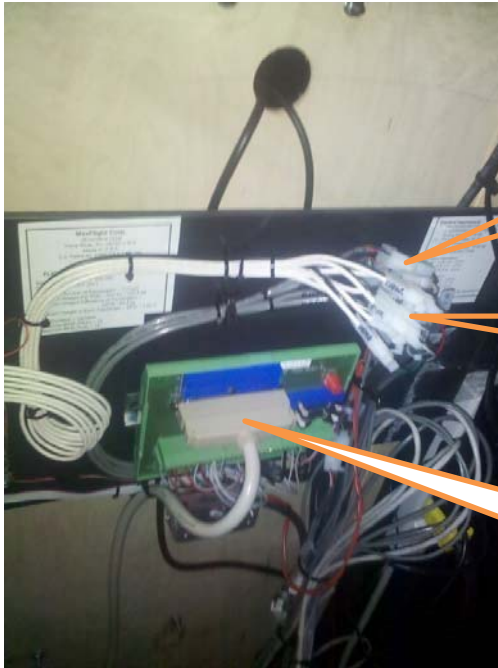
There is one Occupant Safety Switch, e-stop between the seats in the cockpit. The crotch belt switches are parallel to occupant e-stop. One E-Stop switch, which removes power box power, located on front of cabinet by operator station.

1-2M Encoders

Signal powers the light diode that shines through the disc to a receiver diode.

1-2N Interface

Interface Control Boards are by Pro Motion and located behind left front cabinetry.

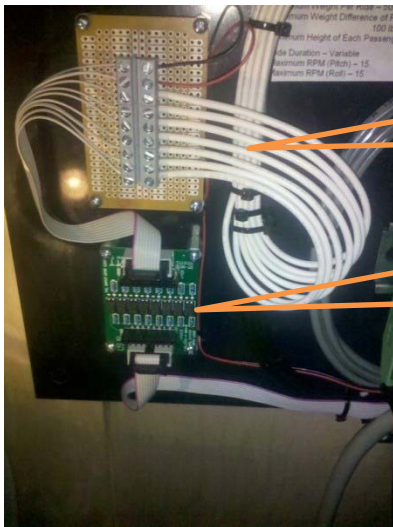


Inverter Signal, relay control, encoders connectors.

Sensor wiring connectors

Pre-molded interface cable between Motion computer and interface board.

Connected to the motion computer PCI motion card also manufactured by Pro Motion company. All signals to and from motion computer to the machine passes through the pre-molded cable to the interface circuit board.



Wires to all machine sensor circuits. Plugs are marked as to circuit function.

DO/IO isolation board with indicator lights that show when sensors are triggered on the machine. They help in troubleshooting.

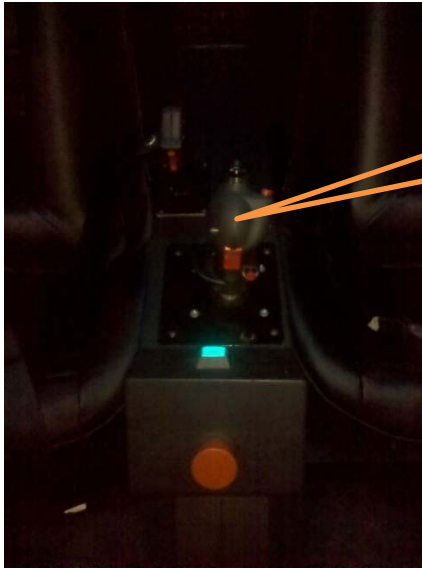
A DO/IO isolation circuit board is used to interface between all the machines sensors and the interface board. It's function is to electrostatically isolate the sensors from damaging the interface DO/IO chips. It also has indicator lights that help in troubleshooting.

1-20 Roll Slip Ring

Located inside the weldment roll drive shaft and the cockpit. Mounted inside the roll shaft it passes the signal to the cockpit. These units are sealed and no maintenance allowed.

1. **H24-4** mini slip rings are mounted on the inside of the roll drive shaft on aft end inside center weldment. These are gold contacts and rings. No maintenance required.

1-2P Joysticks/Throttle and UGC/USB HAAP Box Interface



Joystick located on center console. Inside console are the two USB HAAP control circuit boards.

There are two flight joysticks and two throttle's installed within the cockpit area. These units interface to the HAAP controller's (two) installed between the seats inside center console. The signals are transferred to the on-board CPU via a USB cable connector by way of dual USB controller on mother board or PCI board mounted to the mother board.

1-2Q Bose 5.1 surround sound system

The sound system consists of a 5.1 surround speaker system. It is installed within the cockpit area above the heads of patrons, in front and back of cockpit. A base response speaker is mounted under the right patron seat. A remote volume and tone control are located on backside of left lower cockpit. Audio is obtained from the onboard computer mother board when games are played.

1-2U Remote Wireless Camera

A wireless type camera is mounted inside the cockpit top left corner by front screen. Transmitter is mounted under right seat frame. Receiver is mounted top right cabinetry just behind flat screen TV. Used to observe the patrons during the ride. Signal can be used to record and copy to CD for sale to patrons.

1-3 Mechanical

1. A-frame - two each, right and left.
2. Center weldment.
3. Pitch arms two

4. Tail shaft
5. H frame assembly, attached to the tail shaft
6. Counterweight gear and gear box
7. Counterweight @500 pounds
8. Chair assembly
9. Seat back assembly
10. Lift drive network
11. Roll motor mounting
12. Pitch motor mounting
13. Roll hub assembly
14. Fiberglass cockpit shells
15. Front stand
16. Rear stand
17. Entry stair assembly
18. Cabinetry

1-4 COMPUTER SYSTEMS

1-4A Command Console



Motion
Computer

LAN Network
switch

Pro Motion Signal cable to
Interface board

Serial RS-45 signal cable
to Inverters

1. CPU- LAN, audio and video located on mother board, PCI based Pro Motion control board, Blastronics communication board, power supply, hard disk drives, CD drive, and software to control it all.
2. Monitor
3. Cabling
4. Network switch (if kiosk is used)
5. Operating system is Win XP-Pro with SP-3

1-4B On-Board Computer

High end computer/processor combination. Contains all the games and their video files



On-board red
Power "ON"
Button

1-4C On-Board Audio/Video System



HD Video transmitter mounted on left backside of steel back. Models may vary.

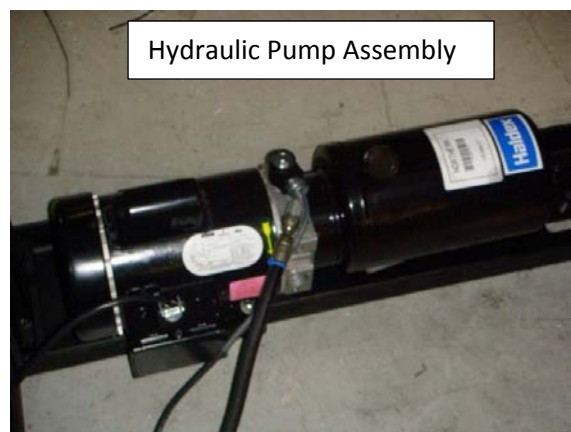
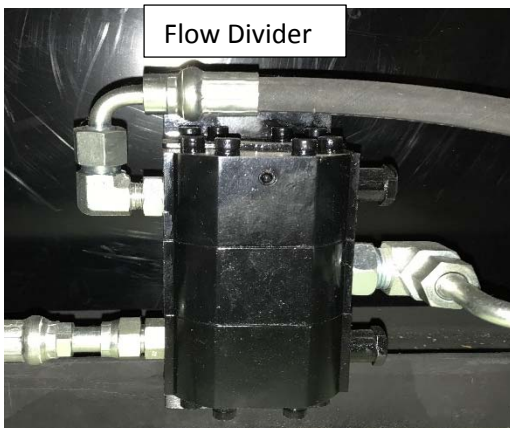


HD video receiver mounted on left top of A-frame behind the TV. Models may vary. Another TV located top of other A-frame cabinetry.

1-5 What Causes the Unit To: Raise , Lower, Stop, Pitch, Roll. etc.

1-5A Raise

When operator clicks on “RAISE” it sends a signal to the computer that in turn sends a relay command to the power box activating the RAISE relays. Power is allowed to the hydraulic motor that drives the pump which raises the lift cylinders on both sides of the machine. The pump will run till both up sensors are closed. This will start a timer allowing overdriving up for a second. This insures that both sides of the machine are all the way up.



This is the hydraulic pump assembly, located inside the right A-frame and cabinetry. The fluid is DTE-26 or equivalent @ 1.2 gal stored in the reservoir that has a vent installed. There are no filters in this system so keep the vent in place and fluid as clean as possible when handling or changing same. The motor is powered by 115 VAC or 220vac depending on site configuration. The lowering solenoid, located on the pump housing, can either be 115 or 220 VAC again depending on location power supply. The pump assembly is located between the drive motor and fluid reservoir. Raise is accomplished by motor powered up, pressure is regulated at 1100 PSI. A check valve allows flow out, through the flow control, through each sides raise control regulators. Lowering speed is controlled by backflow regulator that is factory adjusted but can be adjusted in field.

The flow dividers function is to control even fluid flow to both raise cylinders. This is accomplished by having one entry/return port that drives a mechanical spool internally that in turn only allows equal flow to each respective cylinder. Neither side can go faster since the spool turns only by input flow.

Regulators on the flow divider are factory set and should not be tampered with. There are not maintenance functions internally. Do not adjust anything since this will destroy the factory default setting. Flow control valves can be adjusted in the field if required.

1-5B Lowering

When the operator clicks on “LOWER” icon, it sends a signal to motion computer initiating lower action. Computer sends a relay signal to lower relay in power box that activates the lower solenoid located on the pump housing. This, allows hydraulics to flow back into the reservoir. Hydraulic pressure raises the unit however gravity, brings the machine back down.

1-5C Stop

STOP is a command given by:

- a. Operator sent to motion computer that stops designated motion function.
- b. The e-stop switch, located under operator monitor, removes all three phase power, thereby stopping any/all motion. Power off brakes engage.

1-5D Pitch and Roll

Roll/Pitch

CPU program commands motion via motherboard to PCI Pro Motion card, to the motion interface board, via pre formed cable, then to respective frequency drive unit. Serial communication's, is via a Blantronics PCI mounted card is used to monitor condition of inverters. Rs-485 communication side, can be used to force drive of pitch/roll inverters under certain conditions.

The motion program, generates an analog drive signal (+-10VDC), this commands the direction and rate of movement of pitch and roll.

The respective axis encoder sends a counter signal back to the CPU via the Interface board and cables to the Motion Control card then to the program. When the encoder signal cancels out the drive signal all motion stops.

1-5E Balance

Is a function of the motion computer running the motion program. When the unit is down the LOWERED or DOWN sensor closes, allows computer to reset everything to default 000.

When raise is clicked, the unit raises for a certain time then stops. Usually @ 1.5" from down. The CPU releases the pitch brake allowing the pitch axis to move freely to the heavy side. Depending on which way the unit pivots will determine, using the pitch encoder reading, which way the counterweight will move. Either forwards or back.

The counterweight will drive until the unit pivots to other extreme, goes through zero reading. Weight stops moving, the program commands to drive weight the other way for ½ second. This eliminates the delay latency in signals and reaction time of mechanics. Pitch brake is now set to ON. The unit is commanded to raise till the up sensors are closed. When both up sensors are closed the computer starts a one second timer that allows the hydraulics to continue the lift effort verifying both sides are completely up. Timer shuts OFF and in turn stops the lift cycle by removing raise signal to the raise relays inside the power box.

NOTE! If unit does not counterbalance, go through zero, within 65 seconds a fault is set and unit must be returned to down position. This indicates either an encoder problem or too much weight in cockpit.

1-5F Interface with Motion Control Board



Interface board, mounted directly behind the cabinetry on operator side or left side of machine.

All electrical connections from and to the sensors and encoders that the machine uses are connected here. The signals go to the motion computer via the pre formed cable between interface board and motion control board mounted within the computer.

1. CPU provides +5 and +12 to the interface board from the computer power supply through motion control card and preformed cable to the interface board. This power (+5VDC) is used by the encoders and all sensors except canopy and patron E-stop which use the +12 VDC. Using logic chips on interface board the sensor signals are conditioned for computer use.
2. All encoder signals pass through the interface board to the CPU motion control card and on to the program running.
3. All sensor switch indications run through the interface board. The signal that the CPU reads is either a +5VDC signal or a high switch open or 0 VDC switch closed.

1-5G Interface with Unit Sensors

There are seven sensors that are monitored by the CPU. Signals flow from the sensors to the interface board on to the motion control board in the CPU. These are:

1. LH upper limit
2. RH upper limit
3. Down sensor
4. Patron E-stop sensor
5. Shoulder harness release sensors
6. Canopy sensor
7. Brake release

1-5H Interface with Projector/TV and Monitor

CPU mother board processes the signal and passes it on to:

1. Monitor, connected to video output in rear of CPU, allows the operator to see control windows etc.
2. On board computer sends video to projector as well as HD video transmitter located left rear of cockpit. A HD receiver is located top of left A-frame that sends signal to the TV mounted there.

1-5J Interface with Inverters and the power box

Command Console CPU, controls programs, that send signals through the motion interface software and then to the PCI Motion Control board that conditions the signal, +or- 10VDC, that in turn activates the inverters movement.

This voltage gives direction and rate to the respective axis. The software also monitors inverter status signals, these are transmitted through the serial interface cable from/ to each inverter. This signal also controls when to apply or release the motor brakes and monitors internal parameter functions of each inverter.

1-6 – OPERATING LIMITATIONS

1-6A Computer

When starting up the computer system, the operator should observe any error indications or signs that the computer is not functioning correctly. Provided there are no error messages and the game can be initialized, the system should be cycled at least once to ensure that the computer is functioning properly.

1-6B Restraint System

By raising and lowering the restraint harness you will be able to establish that they are operating properly. If any part should fail, the unit should be shut down until the repair is made.

1-6C Electrical Connections to Power Box and Inverters

The emergency stop button **must** be pushed in and main power connector removed from power box before servicing the control box or inverters.

Warning! Failure to allow the capacitors within the inverters to discharge can result in serious personal injury by electrocution to include possible death.

NOTE: Verify that the main power is disconnected at the wall outlet or circuit breaker panel or power cord unplugged at the power box, wait at least ten (10) minutes before entering the Electrical Control Box. This is to ensure that the power capacitors located within the inverters are fully discharged.

1-6D Frame and Structure

A weekly inspection of bolts and welds should be accomplished to ensure that there is no metal fatigue or loose bolts. Loose bolts should be tightened in accordance with MaxFlight specifications, however, if there is any question as to why there are loose bolts, the unit should be shut down and examined to determine any causes that are not obvious. It is up to the operator to report these conditions to qualified, on-sight technical personnel only. If there are any stress cracks or cracks in a solid member, the system should be shut down and examined immediately.

1-6E Motion Platform

If at any time there is a question with the stability/use-ability of the motion platform, passengers should not be allowed to ride. Inspect and repair any/all conditions noticed before resuming normal operations again.

1-7 What Makes the Unit Function as it does?

The entire motion of the simulator is software controlled within the motion computer. It has inputs and outputs to various components on the simulator. What we are going to explain now is the actual functionality and routing of signals that, if understood will aid you in the troubleshooting aspect.

You must remember that there are three separate programs running at all times on the motion and on the on-board computer.

1-7A Motion Computer

The first program you start up is the windows operating system, in this case Win XP-Pro. This controls the function of the various items located within the computer. Drivers are the software of respective hardware located inside attached to the mother board. Without them, the hardware cannot talk to the operating system.

Communications card, made by Blastronics or USB type, allows the computer to monitor and control functions within the pitch and roll inverters. Functions and parameters are preset at the factory but, can be changed in the field. There are two com ports on back of the card. They are USB and DB-9 connectors.

Only one will have a cable attached to it that goes to the pitch signal ring, signal routes from there to the roll inverter com module located top right of inverter. Signal continues from there through connectors to the pitch power ring eventually ending on the com module of pitch inverter.

Each inverter has its own address so that signals can be routed and gotten from correct areas as needed by the computer. To verify function of the serial data look at the module on each inverter. You should see the top lights flash orange on inverter com modules when:

- a. Inverter is powered ON
- b. Motion computer is OK, operating system normal
- c. You commanded the G3EH motion software to run
- d. Cables are connected correctly and no wiring issues
- e. Address and Baud rate has been set correctly for each inverter
- f. Driver is installed correctly for communications board
- g. The com port required has been properly selected on com board outlet side.
- h. The correct com port has been selected in the motion software as well as the registry and serial DB-9 cable is connected to that port.
- i. No conflict between com board and registry settings
- j. In computer hardware all com ports have been initiated and correct values set.

The computer uses this signal to monitor functions within each inverter. Should safety functions set in the inverter be exceeded, it will shut down that inverter and set a failure alarm code.

There are times a technician can use the serial control function when troubleshooting the system. This is being able to have manual control over the pitch/roll motor and associated brake. If you can move the motors by manual commands, then you know the problem of non- movement, is not the fault of the motion program but input signals from the game program or, network communications issue.

Motion Control Board, Pro Motion PCI mounted motion control board is located within the motion computer. The software drivers for this board are an integral part of the motion control software G3EH program. When this software gets installed so do the drivers for the board. The board has a complicated set of different functions. It is the only way the computer can communicate with any/all sensors and encoders located in various parts of the machine.

It has digital to analog converters, analog to digital converters, power source for any/all sensor requirements. One of the main functions are its digital inputs or DI's and digital outputs DO's signals. These control all the mechanical end functions on the machine. Using a pre-molded cable it interfaces with an interface board mounted behind the cabinetry panel forward left side, right above the motion computer.

The motion Interface panel is means to make mechanical connections for all encoders and sensors.

It is this motion control board located inside the motion computer that converts command signals from the programs running. It changes the drive signals generated from either the flight simulator or roller coaster into directional drive signals for each inverter.

The motion software has a written logic tree that constantly monitors sensors (micro switches), encoders one for each axis, and program inputs and compares them to safety rules and parameters to prevent the machine from damage or out of control issues.

You must be careful when connecting to the motion control board and interface board cabling.

In flight simulator program, the on-board computer sends over to the motion computer via LAN network the required motion signal as generated by the game and game controllers. This signal is routed to the motion board, converted to a + or – 10VDC signal, sent to its respective inverter. The polarity and range of voltage determines the direction and rate of movement the inverter causes on pitch and/or roll axis.

In the roller coaster program, there is a sub-program that runs with each video which has degree values assigned for every picture frame. This value is passed over to the motion program, then to motion control board and eventually to drive an inverter.

Mother Board, controls internal processes, video and audio modules built into the board. USB ports accept mouse and keyboard commands. LAN ports are used for network communications between all the computers. Each computer has its own address plan so LAN traffic can be directed to correct computers.

Power Supply, used to power the functions within the computer and in case of motion computer it supplies power to the encoders as well as the sensor pull up resistor circuit that is mounted on the interface board.

1-7B On-Board computer System

Located under the left seat of the cockpit. It runs a Win-7 operating system that controls all internal/external functions. It contains a high end video card capable of 3-D and HD signals used for the projector system. The three programs that run on this computer at all times are:

- a. Windows operating system Win-7
- b. Flight simulator or roller coaster programs
- c. Dispatch control program, this controls routing of motion command signals to the motion computer via the LAN network.

If any one of the above mentioned programs malfunction, motion stops on the machine.

Video Card

Has all the codecs to control the video for display via the projector mounted at the top center rear of cabin. Current projector models are capable of running HD as well as HD 3D video formats. A second video signal is sent to the HD video transmitter, located in back

of the cockpit. Received by a HD video receiver mounted at the top left cabinetry this signal is used to display video on the TV facing the operator as well as customers. Video displayed is same video that the patrons are watching inside the cabin.

Audio

On-board on mother board is top line audio processing module. This takes the audio from the playing game, sends it to the audio booster box located under right seat and surround sound speakers located inside the cabin. Power to booster amp comes from power strip in center of cabin 115VAC. There is a remote control fastened to left rear of cockpit that allows operator to vary loudness and tone.

HAAP Game Controllers and Joysticks

The two sets of joysticks that the patron uses for the flight simulator program, located within the cabin, are connected to two USB Game Controller boards located inside the center console. These boards are powered via USB from the on-board computer and convert signals from joysticks to the USB connection, to the game software.

5 VDC is supplied to game controllers from on-board computer power supply via USB.

Projector System

Mounted on back center of upper cockpit, it projects via a mirror to a screen mounted in front inside of cockpit. It projects all the video generated by the various programs. Projector can be controlled via a remote control. It is a HD projector system capable of displaying 3D images with the help of electronic glasses and transmitter. Transmitter is located top right of screen. All settings are factory set but can be changed in the field. Bulbs have time limits set by manufacturer and get changed when hour usage has expired @ 3200 hours. Powered by 220VAC from center power strip. See projector manual for specific maintenance details.

CHAPTER 2 – ELECTRICAL SYSTEM

2-1 Simulator Electrical Power

The three phase power requirements for international machines can be, 220, 380, 415, 440 or 480 VAC, 50/60 HZ. This is used to power the inverters that eventually drive the pitch and roll axis. For U.S the circuit is 3 phase 208 volt standard.

The factory needs to know when order for the machine is placed, what three phase power you have, so that the inverters and motors can be matched. Once delivered changes cannot be made unless inverters are changed and motors rewired.

The other power required are two 115VAC single phase, 60Hz. This is used to power all the computers, fans, battery backup as well as power for the hydraulic pump motor.

One single phase 220VAC or 115vac connects to the power box and is routed to the pump motor through relays when the motion computer demands it.

The second single phase is connected to the battery backup that serves two purposes.

1. Backup power to the power box lowering relay and emergency lower switch. The backup power (UPS) must always be on and fully charged for the lowering function to operate correctly.
2. The rest of the machines electrical power goes through UPS surge protector side connector. This protects the electronic components from power surges.

2-2 Three Phase Power

The three phase power comes from the wall to the input connector on the backside of the power box. Inside a solenoid controlled contactor, controlled by the e-stop power switch, located under the monitor at the operator station.

Switched on, provides three phase power to the pitch and roll inverter banks. Switched OFF, (E-stop switch pushed in) instantly removes all three phase power thereby stopping all motion on the machine and automatically through mechanical means applies the pitch and roll axis brakes. Power off brakes.

2-3 Initial Wiring Confidence Check

This mainly applies at the factory when the machine is being built. This procedure can also apply in the field if major repairs or changes have been made.

This check is to verify all power connections are correct, all cables routed correctly to prevent damage around or past any moving parts. In other words before applying power after a new build or maintenance action verify all electrical connections and cable routing by visual means.

2-3A Lenze Inverter Setup Procedures

If you just installed a new inverter it must be setup with parameters and an address. Pitch and Roll inverters must also be auto-tuned when connected to each motor, prior to full motion commands.

Caution! The following setup procedures must be followed or damage to motors will occur. Whenever a new inverter is turned ON, it outputs 25 HZ drive signal at full voltage to the motor.

So, it is imperative that no motor/s are connected to the inverter/s until after all inverters have been initialized. **Motors will overheat and be damaged.**

1. Verify Power is “OFF” to inverters and power box.
2. Verify that the dip switches on the lower analog communications module, model E82AFSC010, are set as follows;
 - a. From left to right
 1. UP
 2. UP
 3. DWN
 4. DWN
 5. DWN
 - b. The analog terminal connector body is snapped onto the module.

- c. The module is connected to the inverter and the shorting plug, (white with pins sticking out) is installed under the lock bar right side of module.
- d. Verify the following;
 - i. Pitch Inverter,
 1. Red wire to term 8
 2. Black wire to term 7 and jumped to term 39
 3. Jumper between term 20 and 28
 4. Jumper from term 9 to 59
 5. A1 term to brake relay
 6. Term 39 to brake relay
 - ii. Roll Inverter,
 1. Green wire to term 8
 2. White wire to term 7 and jumped to term 39
 3. Jumper between term 20 and 28
 4. Jumper between term 9 and 59
 5. A1 to brake relay
 6. Term 39 to brake relay
3. Verify that all motors are disconnected from the inverter/s.
4. Obtain the manual control key pad, model E82ZBC, used for 8200 series vector inverters.
5. Remove the Rs-485, electronic control module, located at the top of the inverter. You may have to loosen the center set screw so that the module can be pulled out.
6. Verify that the jumper, on left side, is connected to the lower two pins left side.
7. Snap on the manual key pad module. Careful not to bend pins.
8. Turn "ON" power to the inverters, keypad will show legends.
9. Press "1+2" function bar on keypad.
10. Press "right arrow" will show "User"
11. Press "UP" arrow to change function to "ALL"
12. Press "1+2" function bar again
13. Press "right Arrow"--- parameter line blinks.
14. Press "up arrow" till parameter #009 shows
15. Press "right arrow" to enable value change in parameter #9.
16. Press "up or down" arrows to change the value.

Note! The following are the addresses for each inverter that you are working with. The Inverters are mounted Roll- located top of center weldment, Pitch located left side of pitch motor/gear box combo.

a. Pitch----- 1 b. Roll----- 2

17. Press "enter" when correct value for that inverter is showing. This will show "Stored" on the screen.

Note! Repeat the above steps until all inverters have the correct address assigned to it.

18. Remove the entry module and connect all Comm. modules on top of the inverters.
Snapped into place. Tighten set screw.
19. Turn power “OFF” to power box for two minutes.

2-4 Input 3-phase Wiring

The wiring of the individual phases of input power to the controllers does not make any difference in the behavior of the drive motors. Guarantee that 220/380/415/440/480 three phase 50/60 Hz, 20 amp power is available. Measure the AC voltage values with a good multi-meter, voltage values must be within + or – 10% before connecting same to power box. Or for U.S. 208 VAC 20 amp.

2-5 Output 3-phase Wiring

WARNING! Before removing/relocating any wires make sure power has been OFF for at least 10 minutes so the internal storage capacitors can discharge.

The wiring of phases between the inverter controller and the motor affects the direction of motor movement. Reverse any two (2) phases of the controllers output to the motor, to reverse motor direction. Before removing/relocating any wires make sure power has been OFF for at least 10 minutes. The internal storage capacitors must discharge

You must test and set correct drive rotation of all motors. This will be tested later in the rotation test sequence.

Output power to the motors from inverters is digital DC in an AC sine wave shape. You cannot test this value with a standard voltmeter.

2-6 Auto Tuning the Inverters

After the inverters have been initialized you must load or verify that the new Motion_G3EH_LENZE_1.0.8 and Motion_G3EH_Lenze_PCI_1.0.1 has been installed on motion computer. All control cables/wiring has been properly installed on the machine.

Auto tuning of the inverters is required before you can run anything using the motors and inverters. The inverters have to check themselves and verify that they are connected to a motor and there are no faults in the wiring. To perform the auto tuning sequence follow the below instructions:

1. R-click on red “M” on desktop, select OPEN and allow program to open fully.
2. Pull out E-stop front of cabinetry.
3. The RED inverter lights must turn to GREEN and flash.
 - a. This indicates that the inverters are communicating with the motion computer.
 - b. If they do not flash green then you must troubleshoot the comm. wiring or verify power is ON to inverters.
 - c. The lights must flash green on both inverters or rest will fail

4. Click on **FILE**, left side of motion program window, select **New**. 5. When next window opens, select **Inverter Client**. Click **OK**
6. When next window opens up.
7. Go to top and click on pitch tab.
8. On left side click on **Initialize Inverter** icon and allow the computer to load inverter parameters.
9. Repeat with roll inverter step8
10. After loading of parameters do not turn power off but proceed with auto tuning.
11. Click pitch tab on top
12. Click **Auto Tune** icon, allow computer to finish the test
13. Monitor the current reading in center column
14. When current value goes to zero and stays there, the test is done.
15. Click on roll tab top.
16. Click on **Auto Tune** icon and allow computer to run the test.
17. When current value goes to zero and stays there, the test is done.
18. Close windows
19. Exit the program to desktop.
20. Turn e-stop power off, push in on button.

2-7 Rotation Test of Pitch and Roll motor

Before commanding motion of the motors, verify that the new Motion_G3EH_LENZE_1.0.8 and Motion_G3EH_Lenze_PCI_1.0.1 has been installed on motion computer. All control cables/wiring has been properly installed on the machine. Parameter loading and auto tuning of the two inverters must be complete before testing motor rotation. The following steps are required for proper motor rotation.

NOTE! You must raise the machine manually to the top before testing motor rotation.

1. Auto tuning of roll and pitch inverter must already be done for rotation test. If not go and perform those procedures first.
2. R-click on red “M” on desktop, select OPEN and allow program to open fully.
3. Go to rear of machine, open emergency raise lower flap, push and hold “RAISE” till unit is all the way to the top. As soon as it touches the top release the raise switch.
4. Pull out E-stop front of cabinetry.
5. The RED inverter lights must turn to GREEN and flash. This indicates that the inverters are communicating with the motion computer. If they do not flash green then you must troubleshoot the COM wiring or verify power is ON to inverters. The lights must flash green on both inverters or rest will fail 6. Click on **FILE**, left side of motion program window, select **New**. 7. When next window opens, select **Inverter Client**. Click **OK**
8. When next window opens up.
9. Go to top and click on pitch tab.

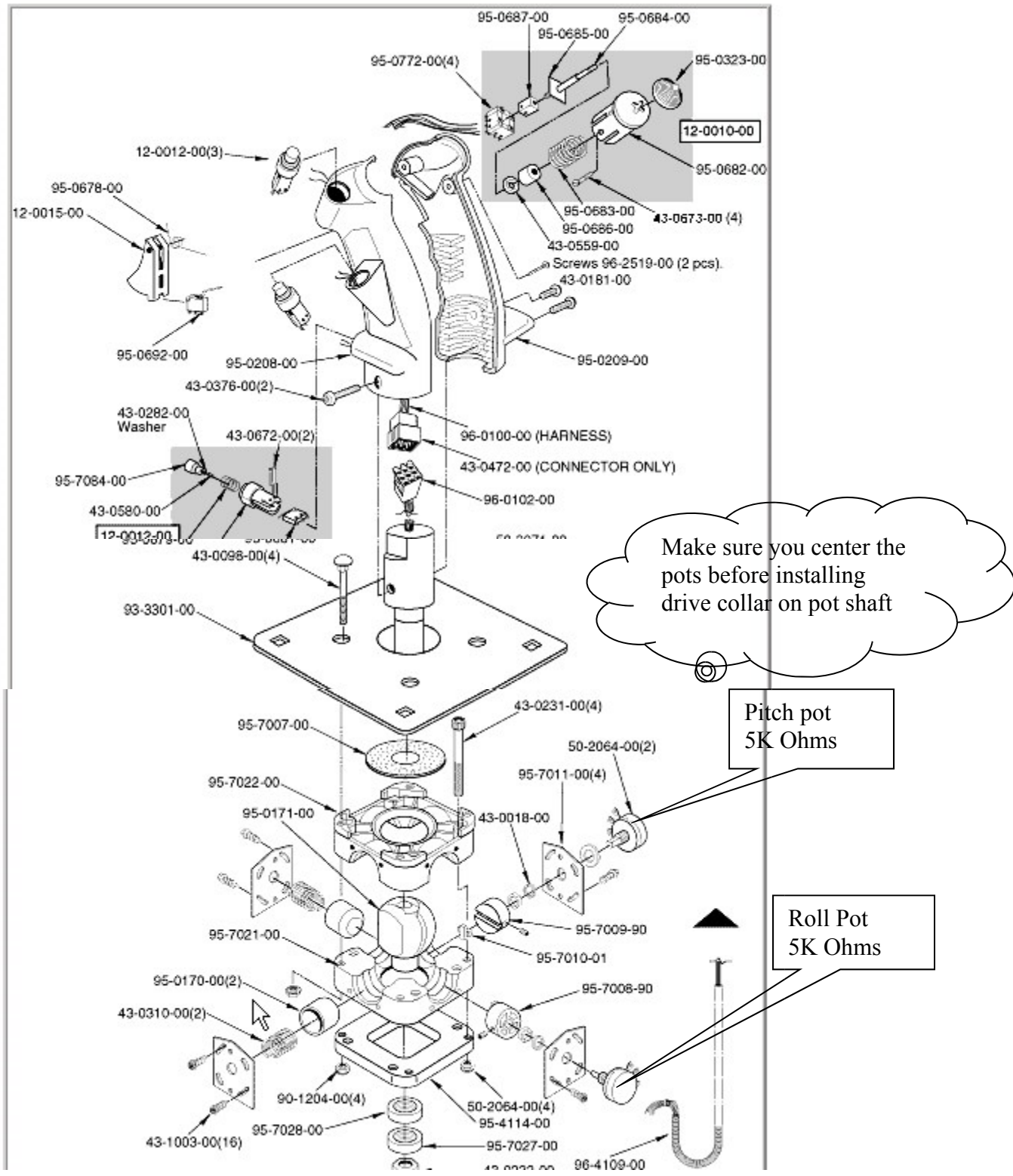
10. Make sure people are clear of rotation.
11. Click on **+Jog** icon, front of machine must go up. If OK or not OK click stop, pitch motion stops. If correct go to 11-e and finish. If not 11-a.
 - a. If not correct motion, you must power down, wait @10 minutes, to allow capacitors to drain.
 - b. Switch any two wires on bottom of pitch inverter and retighten set screws.
 - c. Pull out e-stop again to power up the system
 - d. Click on **+Jog** again if correct, click stop
 - e. Click on **-Jog** if correct, click stop and go to next inverter
12. Click on roll tab
13. Verify people are clear of rotation
14. Click **+Jog** machine must turn right. Reference is you sitting in the machine. If OK or not OK click Stop. If correct go to 14-e and finish. If not 14-a.
 - a. If not correct motion, you must power down, wait @10 minutes, to allow capacitors to drain.
 - b. Switch any two wires on bottom of roll inverter and retighten set screws.
 - c. Pull out e-stop again to power up the system
 - d. Click on **+Jog** again unit turns right, if correct, click stop
 - e. Click on **-Jog**, unit turns left, if correct, click stop, rotation test done
15. Close all tabs
16. Turn power off, push E-stop in.
17. Level and lower the unit manually.

2-8 Setup and Calibration of Joysticks and Throttle Controller Interface

Enabling and Calibrating Joysticks/Throttles running USB control Boards.

- a. START (Window Icon) on task bar, select Control Panel, select Gaming Options
- b. Both USB adapters must be visible
- c. Click on one or the other and select Properties
- d. Click settings tab
- e. Click Calibrate and follow Wizard instructions
- f. Select Test and then Apply

2-9 Changing Joysticks and Throttles



The above shows the parts breakdown of the HAPP Control Joystick used in this flight simulator environment. Removal and replacement is as follows;

- a. Remove power to the on-board computer, this removes the +5 VDC supplied to the USB board via the USB cable.
- b. Open the center console and disconnect the respective connector to the faulty unit.
- c. Remove the mounting hardware holding stick to the console or lower cockpit glass and pull old stick out.
- d. Replace new stick the reverse of above steps
- e. Reconnect plugs to the USB board connectors.
- f. Test and calibrate new unit using procedure para. 2-8, within this manual.

2-10 Audio System

The new Bose type sound system is a 5.1 surround sound setup. There is a booster speaker that also contains the audio amplifiers located under the right seat of the machine. Speakers are located top middle left/right of screen as well as behind the occupants. There is a remote control mounted at lower left of the cockpit. This turns ON/OFF the sound can also adjust volume and tone of the audio. Audio comes from a rear connector of the on-board computer. Power to the amplifier comes from a 220 to 115 transformer mounted also under the seats.

2-11 HD Video Transmitter If installed.

Mounted directly to the steel back left center rear cockpit. It takes the video from onboard video card and transmits that signal to respective receiver mounted behind the TV top left A frame. Power comes from cockpit power strip.

Chapter 3 Troubleshooting

3-1 Basic Troubleshooting

Whenever a fault occurs during the operation of this simulator and before you start troubleshooting, ask yourself some questions.

- a. When did the problem occur,
- b. What was the machine/operator doing prior to the event?
- c. What maintenance action was taken prior to the event?
- d. Where is the problem?

Use the simplistic approach and don't go for the major parts. Read the information provided as well as the diagrams provided for you in this manual.

If all else fails, call MaxFlight Tech Support for help, Phone 1-732-281-2007 Ext. 300 during the evening or Ext. 235 during the day.

Day time is 0800 to 1730 Eastern Daylight Time. Rest of the day is on a Voicemail response system. When calling, please leave a valid number, your name and place of business, nature of problem and what you have tried to correct the problem.

Normal response 5-20 minutes upon receipt.

If EMERGENCY state so, faster response, usually within 5-10 minutes upon receipt of notification.

3-1A Trouble loading programs in operator “Command” window

The programs fail to show at the top of the operator control panel after you initiated the “Command Program”, and the message states “Timed Out” at bottom center.

This usually indicates that the request from the motion computer “Command” to the onboard computer “Dispatch Program” was not able to complete the initiation cycle. Something interfered with the request and it did not complete within the pre-determined time limit set in registry settings. To determine where the fault is follow these steps:

1. Open the VNC program and try to see if you can connect with the on-board computer.
2. YES, you were able to connect to on-board desktop, continue step #4.
3. NO, you have to check the network problem. Go to para. **3-1C**. When done then come back and start at step #1 again.
4. While on the on-board desktop, look at lower right on task bar to see if a red “D” icon is visible there. This indicates that the dispatch program is running on the on-board computer.
5. Just to verify its operation, r-click on the icon, select “close or exit”, this shuts down the program. Allow program to exit memory.
6. R-click on the red “D” icon on desktop, select “Open” and allow the program to open fully, the red “D” will again go to the lower right on task bar.
7. Close the VNC program
8. Close the “Command Program” on the motion computer
9. Wait and allow program to clear memory.
10. Re-open the command program, r-click on red “C” on desktop and select “Open”, again allow program to initiate.
11. Do the top row programs now become available?
12. YES, then the issue was a temporary fault with on-board dispatch program. Done, resume normal operations.
13. NO, you should shut down the entire machine, computers and all, and start again just like a morning startup.
14. Does everything come up normal?
15. YES, you are done, resume normal operation.
16. NO, there is a software or settings issue with either the command or dispatch setup. Go to para. **3-1D and 3-1E**. Here you check settings that are unique to communications between the two programs.

3-1 B Unit has no movement when commanded to do so in flight programs.

1. Before troubleshooting, get all information from operator.
2. Close all programs to desktop and open each as you would for daily opening. This way all programs are re-set to default start condition on all computers.
3. Open motion and operator programs normally.
4. Open the flight program normally as listed in section 2 of the operations.
5. Select an aircraft from the list and let it load fully.
6. Does aircraft load OK and does it show on the TV screen?

7. YES, continue here. NO, go to paragraph **3-1B, 3-1C, 3-1D**. Continue testing.
8. Get keyboard and press F2,
9. Widow opens with several selection possible.
10. On top window uncheck the motion checkmark, click OK, this will allow you to test the flight controls on the ground in normal flight video viewed on the screen without movement of the unit.
11. Does the aircraft control movement match the video on the screen?
12. YES, continue here. NO, go to para.**3-1E**.
13. Test all the buttons for operation while watching the aircraft on the screen.
14. Do all the buttons respond, do they cause change on the viewed aircraft?
15. YES, continue here. NO go to para.**3-1E**.for testing and troubleshooting HAAP controllers.
16. If all joystick and throttle inputs are normal, the HAAP controller and on-board computer program are working normally. Now you must test motion using a person actually flying the unit.
17. Press “STOP” icon on program
18. Press F2 again and place checkmark by motion.
19. Click OK, unit is now back in normal safety motion program.
20. Load fellow technician and have him fly the unit normally.
21. Raise unit normally and allow it to get to the top.
22. R-click on red “M” lower right on task bar.
23. Select “Maximize”, this opens the motion control program window.
24. When unit is all the way up, do both UP sensors light green?
25. YES, continue here. NO, go to para.**3-1F, 3-1H**.
26. Back to operator panel.
27. Click on “START” icon to start flight in full motion.
28. Does machine move normally when commanded to do so? Watch video motion on TV versus machine reaction. Do they follow correctly?
29. YES, continue here, NO, go to para. **3-1B, 3-1F, 3-1G 3-1H**.
30. If video movement and machine reaction are the same, the problem is either intermittent or was only a one time issue.
31. Stop ride, lower machine and return it to the operator for normal operation.

3-1C Network Troubleshooting Procedure.

The network on this machine is the interface between all computers on this network. There are possible three computers that can interact on this system. They are the on-board computer, the motion computer and the kiosk computer if, that system is used.

The most used interface is between the on-board and the motion computer. This interface transmits and receives control and motion data from programs running on the on-board computer.

The network may have a switch that is located on top of motion computer. It directs the signals to/from all computers.

If the kiosk is not used the switch is not required. The on-board and motion computer will be directly hooked up using a cross-wired LAN cable that is already built into the cabling of the machine. The LAN cable from roll signal ring to the on-board computer is cross-wired.

Command of the on-board dispatch program, motion data transfer and remote VNC is done across this network.

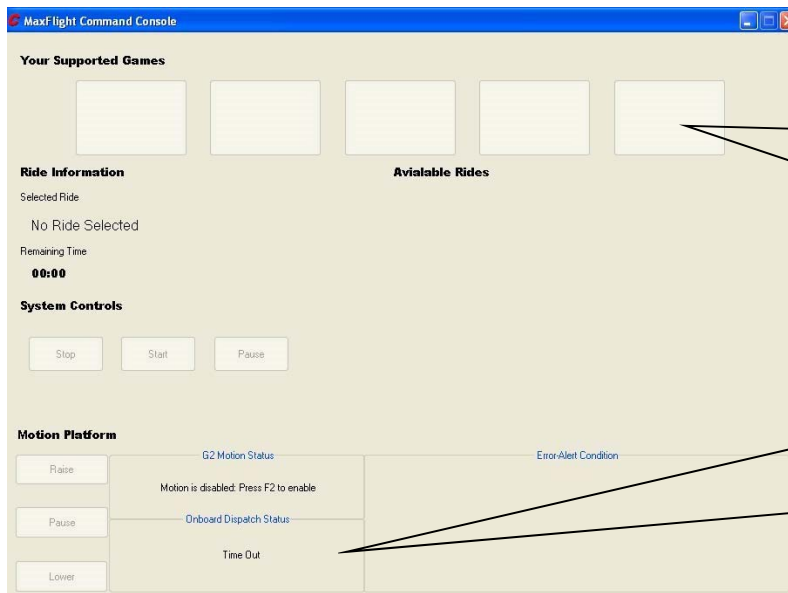
NOTE! Besides cabling, connector ends and slip rings the issue could also be on the mother board mounted LAN system. In that case it will be inside the computer. If you think the mother board network is at fault, a separate network card can be installed, set up with correct IP address and tested. To do this contact a computer repair person if you do not feel comfortable doing this or get instructions from MaxFlight Tech Support.

If you suspect that there is a problem in network communications you can troubleshoot the system as follows:

1. Before major troubleshooting, check all cables and connectors for damage and proper connection.
2. Try remote access to on-board using VNC located on motion desktop. If you can gain access then the LAN network is functioning OK.
3. If you do not gain connection, verify on-board is ON, look at TV and see if desktop is showing there. Verify network switch is ON if used. If all is OK, next.
4. If power was off to either turn on that unit, wait, retest if OK now, DONE.
5. **NO**, still no communication.
6. Direct connect on-board network cable take cable that comes from signal ring out of the switch and connect direct to the motion computer. That's the network cable from the pitch signal ring. It connects either to the switch or back of motion computer if no Kiosk is used.
7. Test VNC operation again, did you gain access to on-board?
8. If YES, continue. If NO go to step 9.
9. If switch was used reconnect back to network switch and retest VNC.
10. **YES**, you gained access to on-board, continue. **DONE** Momentary connection issue.
11. **NO**, try another switch, power it up and retest.
12. With new switch all is working normal, replace the switch with new one and retest.
13. **NO**, still no connection.
14. Obtain a cross wired network cable and connect it between the LAN connection of on-board and the LAN connection on motion computer.
15. Test VNC to on-board, did you get a good connection?
16. **YES**, obtained a connection, **The following items need to be checked to find issue::**
 - a. There is an issue in the cabling or connection of the on-board to roll signal ring or roll ring contact.
 - b. Connection issue in cabling or connections between roll signal ring and pitch signal ring or bad pitch ring contact
 - c. Problem in cable or connection end from pitch signal ring to either the network switch or motion computer.
17. To test remove power and fault isolate the issue using an OHM test meter and wiring diagrams provided at end of manual. Do an end to end continuity test across each signal ring. This will isolate where the problem lies.
18. Did you find an open wire or bad connector?
19. **YES**,
 - a. If a bad connector replace/repair same. Retest.

- b. If ring, use spare cable provided and make new connections on it same as old. Use wiring diagram provided. Retest.
 - c. Re-test if continuity is good now, re-connect all and perform VNC test. If test passes you are done.
 - d. If still **NO GO** on continuity test across a ring after use of spare cable, you have a bad ring. Contact MaxFlight and order a new one.
20. Install new ring and run a VNC test to verify the repair.
 21. If still having issues with network see NOTE at beginning of procedure. It could be one of the computer motherboards.

3-1D Checking Command Program operation (On motion computer)



Supported games windows.
Information comes from on-board computer via dispatch program over LAN.

On-board dispatch status window.
Ready: Game loaded all is OK
Time Out: Command inquiry failed to get supported game info.
Loading: Game selected is loading on the on-board

This is the main operation command console window. This window opens when you selected to run the command program from the motion computer desktop. There is a lot of information that is shown here that can help you determine some faults and error messages displayed. To get into the sub program you have to get the keyboard, have this window open and press **F2**. This opens a subprogram hierarchy, tabs that can be opened to see settings that are required for correct operation of command and dispatch alike.

1. Obtain a correct IP address plan for this machine having issues. This was given as part of the software package at delivery. If not available call MaxFlight Corp. give place of business and machine number EH-***. They will e-mail or tell you over the phone the numbers you need.
2. The IP's for both the motion and on-board computer are required so you can compare these values with the ones set in settings pages you are about to view.
3. Have a MaxFlight technician or software technician on-line to further assist you when reviewing these settings on the information given in settings pages.

General Trouble shooting Guide

Power Problems

Is the unit plugged into a live circuit?

Power Requirements;

Three phase 208,220, International 380, 440, 477 VAC for the motor drive and inverters.
Single phase 115/230 VAC for the control console, kiosk and cockpit power.

Ensure power is available by checking the power on lights on the power strips. If not, check to see if plugged in and if so check the circuit breaker in the main power box.

Command console CPU/Monitor power flows from the wall to the power strip, to the CPU and monitor. Make sure you get a green light on UPS when turned on. If not then there is no external power getting to this unit.

The three phase power can be checked by measuring phase to phase on the main power contactor located in the power box or on input power connector. Also measure power coming from the wall outlet if not there check the three phase circuit breaker in the main power panel.

Check to see if the BLUE reset on the contactor has tripped, if so reset by pressing in on blue button.

Pull E-Stop out on below the monitor. Power must be ON at the Inverters. Check by verifying that the power ON indicators at the top of the inverters is ON --all of them.

If power to the inverters does not come on check the control power going to the switch.

The power is 115 VAC to one side of the switch, pull the switch out and the same power must be available on the other side of the switch.

Computer Power

Is the monitor ON?

Try another extension cord to verify power outlet.

Is the main power strip behind cabinet ON? If not turn it ON.

If the computer does not power up and the above are ON, check the rear of the CPU and see if there is a power switch on the CPU power supply, turn/verify it is ON.

Check to see if power plug to and at the CPU did not pull out. If everything powers up except the CPU this is an indication of a bad CPU power supply or mother board problem.

This power supply is a standard unit that can be purchased at any good computer or electronics supply store.

Do not remove the old until you have the new one so you can match up cabling and power connectors.

Note! Before touching any board within the computer you MUST ground yourself to the computer case by touching the metal case before any components. This will remove the static electricity from your body to case ground instead of through an electronic chip and destroy it. This procedure will prevent you from damaging expensive circuit boards.

Cockpit Power

Turn cockpit power ON by pressing toggle switch on power strip inside left rear of “A” frame cabinetry. The fans and projector should power up if they do not, check power source to the power strip under the seats and make sure that power switch is turned ON.

Power to cockpit goes through pitch power ring on right side center of pitch motor. Connector in center passes power to roll signal ring then to power strip inside cockpit under the seats. Verify that power switch is on if so test, using a meter, the power at the output from roll signal ring. If no power there back track the power wires using the electrical schematics.

Video Problems

For projectors see the respective owner’s manuals. Presently there are two types of projectors in use. Depending if you have HD or HD with 3-D video.

Video feed starts with the on-board computer high end video card. The card has two outputs (HDMI), one for the projector and one for the video transmitter. If you have external video on TV monitor you can probably assume the video card is OK. However, settings may have changed in the software or, that output on the card is defective. Test by switching signal source to projector or TV monitor. If either comes back on with new source then the defect is in the card or settings, drivers etc.

Blue Screen

On projector means signal loss or fault internal to projector. If both TV and projector have same blue screen the fault is most likely in the on-board computer. Reboot the on-board and see if software resets. If not, you may have a faulty computer, mother board or hard drive. Call MaxFlight for assistance.

Audio Problems

Dual Computer Systems

For dual CPU systems the sound goes direct from CPU to main power amp installed in cockpit then to the speakers. If no sound, check power first, check volume on amp and/or main volume setting on computer output. On units with separate On/Off, tone and volume remote, check/verify volume is not turned down on it.

External speakers get a signal direct from main power amp to each speaker. If there is a problem check the wiring, speaker. Try fuse on main amp, some of the units have fuses mounted internally.

Check and insure the power transformer did not come out of the cockpit power strip.

If sound is noisy or scratchy

Usually a speaker problem, switch speakers if clear, it’s the speaker, if same it’s either wiring or main amp problems.

If Unit does not Raise

Main power not enabled.

Check to see that the E-Stop is pulled out and power ON light is on top left of any inverter. If unit works after E-Stop is pulled out you are done.

If not, check if Hydraulic motor power cable came out on the power box side. Check and verify the down sensor is seen by the motion program. If program does not see down/lowered sensor the computer will fault the system by not allowing raise to happen. Verify that cockpit e-stop and or canopy sensors are not set. This will also inhibit raising of the unit.

Check hydraulic power relay system.

Check 12VDC power supply in power box for correct voltage and fuses.

Verify 220VAC is available at pump output connector, if not issue is either wall connector unplugged, CB for that outlet not set, no signal from interface/computer, or faulty lift relays in power box

If power is available and all else checks out you may have a faulty pump motor.

If Unit does not Lower

Motion program not running or faulted. Check motion window for any messages or color other than white.

Is the power backup system on line, powered up green light on in front? If this unit is OFF, lowering will be inhibited. The lowering relays inside the power box, need this power at all times for lowering to occur.

Check command signal source from interface/computer using the schematics at end of manual.

Unit Raises but not Normal

CPU program error, counterbalancing problem, encoder failure or error on pitch and/or roll or a mechanical interface problem.

Balance valves on lift cylinders not set right

Mechanical interface—ride out of square or plumb.

Check these to correct the problem with pitch pivot blocks jamming on the lift keyways.

Faulty lift cylinder

Unit Fails to Counterbalance

Can be caused by a faulty pitch encoder, pitch motor brake, brake pad sticking, bad interface board or motion control card, bad cables or CPU program.

Open Motion Program window, while one person peers down the inside of the tail cover, click on back/FWD icon for C/W drive. If no movement:

1. Bad 24VDC power supply or blown fuse located top of center weldment. Test using multi-meter.
2. Check CW relays on top of center weldment K5 and K6, these are reed relays mounted in separate sockets.
3. If counterweight goes FWD but not back or vice versa, switch K5 and K6 relays and retest, if movement now changes direction, replace both relays as a set. Retest.

4. Solid state relays that drive the reed relays could be faulty or not get signal from interface/computer. Use diagrams at end of manual to troubleshoot.

Pitch Encoder—test in Motion Client program

Pitch Brake—test by holding brake open manually while trying to balance.

Cockpit Leveling Setup

For the platform to balance correctly it must be installed correctly and level. To level the platform correctly, lower all the way down, with tail cover installed place a level on the center weldment. Move counterweight all the way back to insure back is down solid on rear stand. Adjust rear stand top board until the bubble in the level indicates level condition. Then adjust the front stand to within a ¼ inch from the bottom of each side of the cockpit. Insure that the cross bar in front is level by placing the level upon it. You may have to raise platform slightly for this step.

Down Sensor

If this sticks or is not seen by the motion com program it will not reset the encoders and programs back to default or zero. This will affect the next cycle balancing procedure. See balancing procedures.

Fails to Raise Level in Pitch or Roll

Normally caused by the front/rear stand not adjusted correctly. See Cockpit Leveling Setup. Can be weight imbalance not within 100 pounds side to side. If constant could be loose encoder or faulty roll motor brake. If pitch usually caused by an encoder.

Unit Stops Motion

Occupant Safety Switch

Located within the cockpit between both seats. Enables the occupants to signal the operator that they want the ride to stop, lower and they want out. When pressed, it will stop the ride motion, bring the platform to the HOME position, level in pitch and roll facing forward to the stand. Operator clicks on STOP icon in program then lowers the ride, occupants depart, and reset the switch and ride is ready for next patrons. Sensor is normally OFF. Can be tested in Motion Client program.

Canopy Sensor

Canopy sensor activates by either canopy latch releasing, faulty switch, switch wired wrong after repair, switch adjusted incorrectly, wiring or faulty rings. When the switch activates it will stop all motion instantly, freeze the TV image. An alert condition window will open on monitor. Operator must press the E-Stop on side of console and begin the manual leveling and lowering procedure. Allow the patrons to egress. Turn the program OFF and then back ON to test system for repeat failure. Check the operation and adjustment by using the Motion Client program. Canopy sensor must be functional for the ride to operate to the public.

Up Sensor Faults

Unit raises and balances normally. Continues to the top and the program freezes allowing no further motion. Or, during a normal run the platform stops motion and comes to the home position disabling further motion. An alert window will open "Platform was raised but does not see the up sensors". Operator clicks on lower and platform should lower to down stops. Should program become locked during this phase manual leveling and lowering will have to be performed. Switches can be logically tested in the Motion Client Test program.

Using the diagrams at end of manual, test at the interface board for +5 VDC to the switch if you see this then the CPU power supply is OK. Test the switch using Ohm meter for continuity. If switch/es are OK test the interface card, cabling to/from CPU, cables to the switches. Could be faulty Motion Control Card in CPU.

Software Problem

Computer freeze up. Can be caused by any number of reasons. Usually by not defragging drives, running a screen saver, operator playing with buttons or just a internal process malfunction. Level and lower unit, get people out and shut system down then back ON. Retest by running several demo rides. If all well go back to normal operations.

Encoder Drop Out

Should a encoder stop working while running, the safety software included for motion client, will stop unit when loss of encoder signal happens. The unit will stop wherever it is at that time. Manual leveling and lowering will be required.

WARNING! Shock hazard and possible electrocution voltages exist in the CPU, Power Box and all AC voltage connection points. Care must be used. If you are not familiar with high voltages do not tempt fate and allow a qualified person to perform these tests. Special danger exists inside the inverters that contain two storage capacitors each capable of holding 400 VDC.

Inverters

Power must be OFF to the inverters for a minimum of 10 minutes before starting to disconnect wires. This allows the storage capacitors to discharge to ground. Replacement inverters must be programmed with the initial parameters before the CPU can talk to it. See the technical manual for correct procedures. Inverters malfunctioning can stop motion at any time and should not be excluded from troubleshooting practice if you have a problem. Normally, if an inverter drops out, you will get an alarm notice on the desktop. There are two the same and can be switched for testing purposes just remember, the inverter address must be changed or inverter will not perform in that axis.

Roll/Pitch Chatters and cockpit vibrates a lot.

Can happen while running the Activity Program in Client or Test program.

- a. When running a program the axis at fault will chatter rapidly within a few degrees of movement.
- b. When running the Test program, the indication will show that RPM of motor is up but, the motor only oscillates within a ¼ turn of the motor, current will be higher than normal .
- c. Inverter bad will not show an alarm fault—change out inverter

NOTE! If the motor windings were bad the inverter would alarm fault inverter during self-test at power turn on.

Pitch: sudden movement or erratic inadvertent movement

Cause: One of the three phase wires feeding the pitch motor is broken in half ie; fatigued due to bending at the strain relief going into the motor connection box. The wire makes momentary contact as the machine is told to move or at the completion of a move. At times, a wire may stick through insulation touching the cable ground shield.

Correction: remove power to the motor, Ohm check each lead end to end while someone moves cable up and down slightly between motor and cabinet tie point. Meter will fluctuate between a short and open. Repair by cutting out the bad section and reconnecting to motor leads with fresh wire pigtail from cable.

Quick Brake Test if Inverters Fault on Over-current Fault.

1. Open the Motion Client program
2. Raise platform to the top.
3. Start the Motion Test program.
4. With another person holding either pitch/roll brake open manually, test brake release by trying to move axis manually.
5. Cycle the axis in question by clicking either up/down icon for pitch or left/right icon for roll.
 - a. Make sure persons performing the brake test are in communication and sight of each other to prevent personal injury due to unit motion.
 - b. If the platform moves freely without faulting the inverter, then the problem is in the brake circuit.
 - c. If the inverter faults out now, then the problem most likely is in the inverter. Remove and Replace the inverter and retest system.

Lenze Style Inverters.

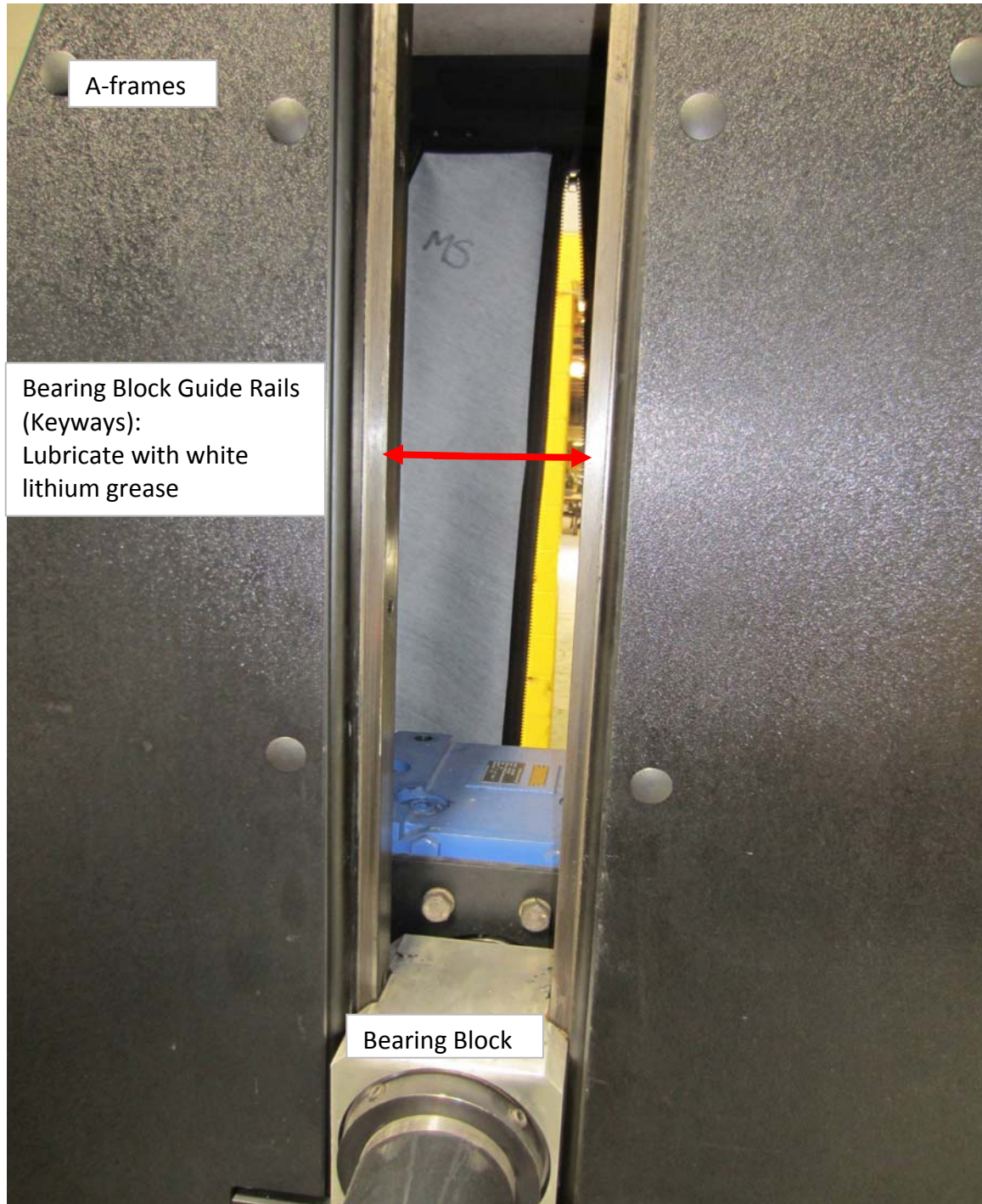
To test communication of this system;

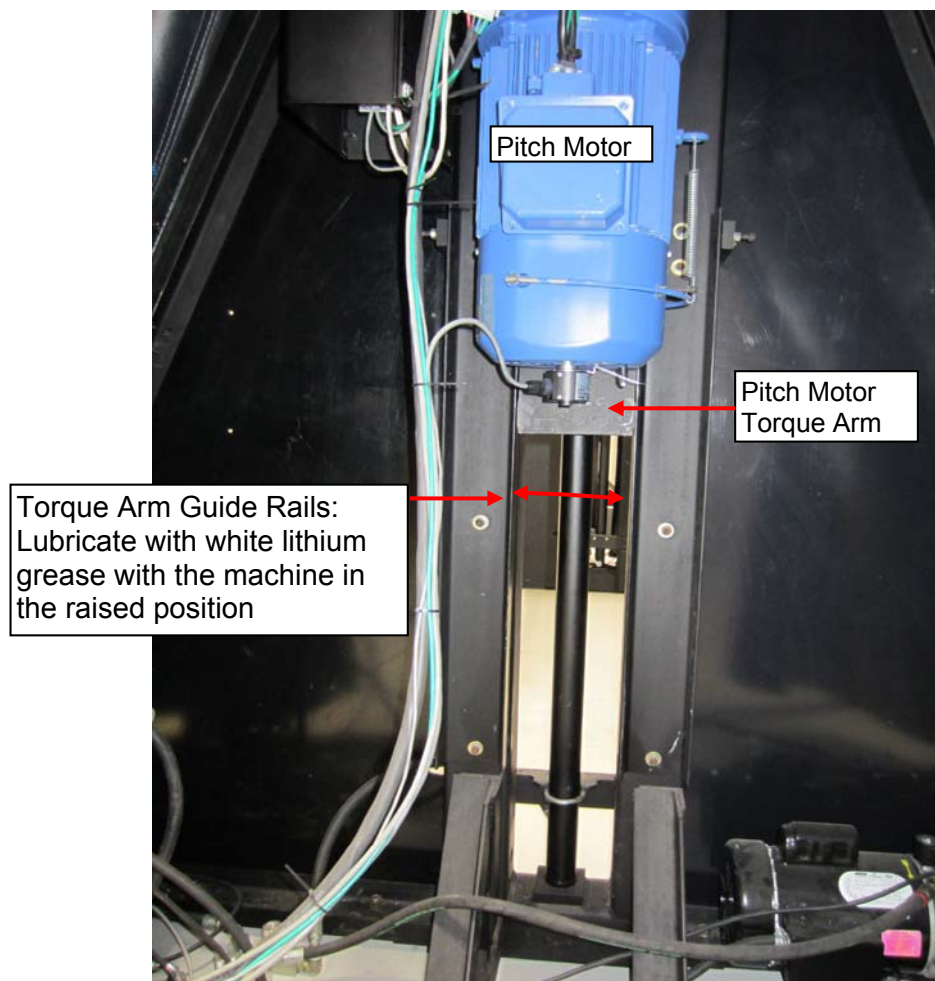
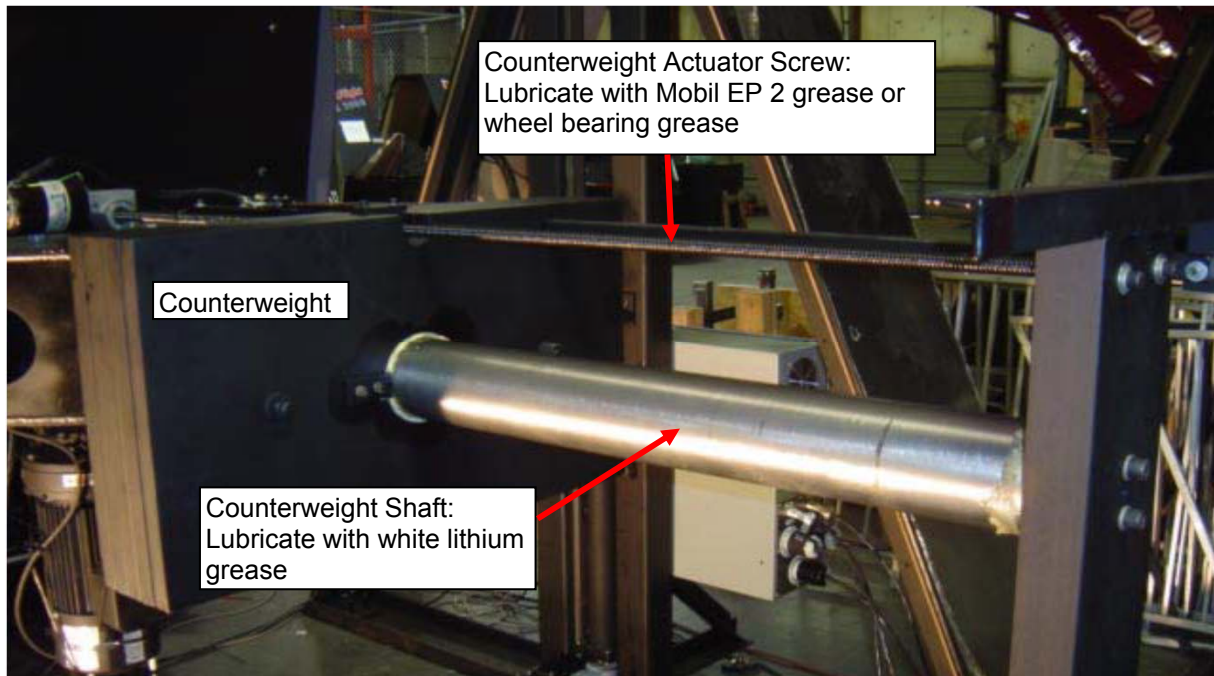
1. Open the Motion Client program.
2. Pull E-stop button out, apply inverter power.
3. Verify all inverters power up red and green light ON, on all the inverters. If not, that inverter has a problem.
4. Verify all communications modules are installed top of each inverter.
5. The red lights on top in motion program, must change to green for proper communications and inverter operation.

Note! Just one inverter not communicating will prevent the normal operation of the motion com program.

MaxFlight Electric Machine Lubrication Procedure (Hydraulic Lift, Sealed Bearings)

NOTE: Inspect and lubricate parts at regular intervals (e.g., weekly to monthly).
Lubricate as needed depending on use and environment.
Clean parts before applying a light coat of lubricant.





Electric Unit Daily Inspection Checklist (Hydraulic Lift)

Date of Inspection:_____ AM Inspected By:_____

PM Inspected By:_____

*** These sheets must be filled out completely and kept in your records.**

<u>AM Check</u>	<u>PM Check</u>
------------------------	------------------------

_____	_____	Inspect projector/TV for proper operation and cleanliness
_____	_____	Make sure that the ductwork is secure and functioning properly
_____	_____	Check to see canopy sensor works properly
_____	_____	Make sure the sound system and speakers are secure and operational
_____	_____	Make sure the cockpit Occupant Panic Switch is functioning properly
_____	_____	Inspect harnesses and harness switches for proper operation and condition
_____	_____	Inspect seat belts and crotch belts for proper operation and condition
_____	_____	Make sure gas spring safety clips are secured properly
_____	_____	Make sure the screen assembly is secure and in good condition
_____	_____	Make sure canopy alignment pins are tight
_____	_____	Inspect the cockpit latch and safety strap for proper operation and condition
_____	_____	Check stairway and front platform for any movement
_____	_____	Ensure the operator Emergency Stop Button is functioning properly
_____	_____	Make sure the tail boom stand is in good condition and its proper location
_____	_____	Ensure that the molding on the cockpit and tail boom cover is intact and secure
_____	_____	Make sure tail cover bolts are snug
_____	_____	Inspect all fiberglass for any visible damage
_____	_____	Make sure all pine tree fasteners are in place and panels are secure
_____	_____	Check for general ride cleanliness
_____	_____	Inspect any entrances, exits, stairways, ramps, fencing, guarding and barricades
_____	_____	Inspect the hydraulic lift system for leaks or wear on the hoses, fittings, valves and pump
_____	_____	Ensure the Manual Brake Release Handles and Raise/Lower buttons are functioning properly

NOTE: When inspection is completed, run one full ride cycle to ensure all system components function properly.

PM - Weekly, Monthly, Semi-Annual

Inspected By:

Reviewed By:

Time Started

Completed

* Indicate Below That All Components Have Been Inspected, Repaired OR Need Repair By Putting The Proper Symbol In The 'Effect Status Box' To The Left Of The Category. Circle Component That Requires Repair And Write Details In Comments Section.

Page 1 of 2

Monthly Inspection:		
	Complete the Weekly Inspection.	
	Open power box and vacuum inside as needed	
	Inspect shoulder restraint release system for security and operation including gas spring mounts.	
	Lightly oil the canopy hinges.	
	Inspect the condition of the upper and lower canopy latch assembly	
	Tighten any loose screws on the fiber glass body, Cockpit and Tail assembly	
	Check for loose lag bolts inside the cockpit seat to glass mounts.	
	Inspect the condition of all fiberglass parts.	
	Inspect the complete hydraulic lift system for any signs of leaks including all hydraulic fittings, valves, lines, etc. Inspect all hydraulic lines for any signs of wear or contact points.	
	Open computers; clean any dust, check fans, connections, etc. as needed.	
	Inspect the front stairs, fencing and entry gate for condition and cleanliness. Inspect patron que area for any unsafe conditions.	
Semi-Annual		
	Clean and polish all the fiberglass parts	

MaxFlight Operators Training Checklist

Check when Complete

Overview of the Unit	_____
Safety	_____
Queue Line Safety	_____
Loading/Unloading Safety	_____
The Pitch Axis	_____
The Roll Axis	_____
The Vertical Lift System	_____
System Start-up Procedure	_____
Height and Weight	_____
Game Selection	_____
Customer Pockets	_____
Recommended Passenger Loading Procedure	_____
Description of Passenger Restraint System	_____
Game Start Procedures	_____
Operation Control Icons	_____
Game Over Procedure	_____
System Shutdown	_____
Emergency Termination Procedure	_____
Emergency Stop without Electrical Power	_____
Manual Leveling Procedure	_____
Manual Lowering Procedure	_____
Emergency Raise Procedure	_____
Power Interruptions and Restart Procedures	_____
Ride Evacuation Procedure	_____
Operational and Termination Conditions	_____
Operational Restrictions and Termination Conditions	_____

Trainer Signature: _____

Date: _____

Operator Signature(s): _____

Date: _____

MaxFlight Electric Machine Startup (G3EH Motion)

1. Turn the switch on the A-frame power strip to **ON**.
2. Turn the **Motion/Operator Computer ON** by pressing the power button on the front of the computer inside the a-frame.
3. Confirm the **Monitor is ON**.
4. Turn the **TV(s) ON**.
5. Confirm the **Audio System is ON**.
6. Turn the cockpit **TV/Projector ON** using the remote control (and camera if installed).
7. Turn the **On-board Computer ON** by pressing the red button on the back of the case.
8. Wait for the computers to boot to the desktop and initialize the programs.
9. On the **Motion Computer**, click on the **G3EH Motion** icon to start the **G3EH Motion Program** and allow it to initialize.
10. Complete the daily safety checklist.
11. Pull out the main power **E-Stop** under the monitor for the power box/inverters.
11. When the inverters are powered up you will see **Green** lights blinking on the motion screen for the listed inverters.
12. Open the **Command** program.
13. Wait for available rides to display.
14. Click on a Flight or Video/Coaster tab from the game options. A list of available aircraft or coaster tracks will show under **Available Rides**.
15. **Select an aircraft or coaster track**; this will initiate the on-board software. When the program is fully loaded on the onboard computer the Dispatch Status Window will state **“Game is Ready”**.
16. **Load patrons** and verify seat belts, shoulder restraints and crotch belt are correctly positioned and fastened about the patrons. If running a **Demo (empty)** ride buckle the seat belts and harness belts.
17. Explain the controls and occupant **E-stop function**.
18. Close and **Latch the Canopy**, install safety cable.
19. To run each ride:
 - a. Click on **“Raise”**, the machine will raise to the balance position; counterbalance, and continue raising to the top run position.
 - b. When fully raised the **“Start”** button will be available (dark).
 - c. Click on **“Start”** to begin the ride.
 - d. The ride will run until the flight time or track ends, at the end of the ride the machine will return to the **Home** level position.
 - e. The **“Lower”** button will now be available.
 - f. Click **“Lower”** to bring the machine down. **NOTE:** Wait for the machine to come to a complete rest on the platforms before opening the latch.
 - g. Open the canopy and assist patrons from the machine.
 - h. Extend belts for the next riders.
 - i. Repeat above steps for each ride.

NOTE! Should the patron inside press the **“E-Stop Button”**, the machine will stop and return to the home level position. A **Yellow Alert Message** will appear in the lower

Command window. The operator must click on “**Stop**” before the “**Lower**” button will be available. Click “**Stop**” then “**Lower**” to bring the machine down.

Keyboard Commands (With Command window open):

1. Press “**F2**” to open an **Options** window, on the “**General**” tab you can change the ride time for the flight programs or enable or disable motion by checking or unchecking the “**Enable Motion**” box. Disabling Motion allows you to test the programs in the machine in the home lowered position with no motion.
2. Hold the “**Alt**” key and press “**Enter**”, this will close any game that is open on the **Onboard Computer**.

System Shutdown:

The machine must be shut down in a sequential procedure to insure the longevity of the projector and computers. Never just turn off the power switches or breakers to shut down the machine.

1. Press in the main power **E-stop** under the monitor to shut off power to all inverters/motors.
2. Using the remote, turn the projector power off by pointing the remote to base of projector and pressing the power button twice. **NOTE:** The projector fans will still run, wait approximately 5 minutes before shutting off main power.
3. With the **Command** screen still open press “**ALT & ENTER**” on the keyboard at the same time to close the game on the **Onboard Computer**.
4. **VNC** to the onboard computer; Open the **Tight VNC** icon and select **Connect**.
5. Once connected to the onboard click on “**START**”, then “**SHUT DOWN**”, then “**OK**”, this shuts off the computer. **NOTE:** You may have to hover the mouse over the Taskbar to get it to pop up if it is on auto-hide.
6. Repeat shutdown procedure for the **Kiosk/Stand-up** and then the **Motion Computer**.
7. Turn A-frame power strip switch **OFF**.

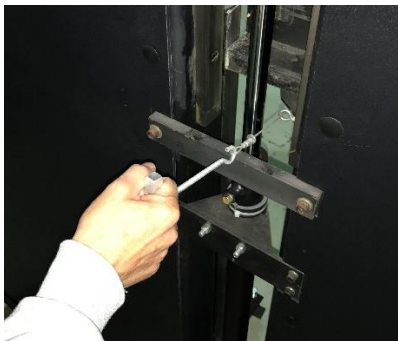
Emergency Stop Procedures

Rider Pushes the Emergency Stop Button Inside the Cockpit:

1. When a rider pushes the emergency stop inside the machine, it will return to the home level position and a yellow alert message will display on the Command Console window.
2. In this case the operator will use the Command Console software to lower the machine.
3. The operator must first click **Stop** and then click **Lower** to lower the machine.
4. When the machine is fully lowered open the cockpit and release the riders.
5. Release the emergency stop button inside the cockpit before the next ride.

Operator Pushes the Emergency Stop Button:

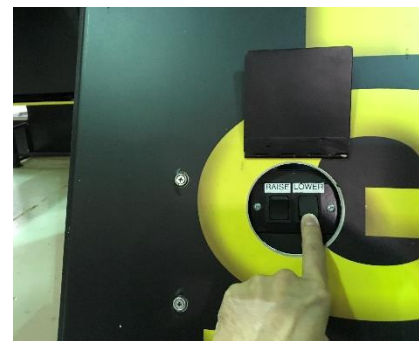
1. In the event of an emergency situation or a fault with the machine, or a power failure, the operator must push the operator emergency stop button, this will stop the machine where it is.
2. A red emergency message will display on the Command Console window.
3. In this case the machine must be manually leveled and lowered.
4. Use the manual brake release handles to level the machine in pitch and roll per the emergency training procedures.
5. When the machine is at the home level position press the manual lower button to lower the machine.
6. As the machine approaches the docked down position verify level before fully lowering.
7. When the machine is fully lowered open the cockpit to release the riders.



Pitch Brake Release



Roll Brake Release



Manual Lower Button

Calibrating Joysticks in Windows 7:

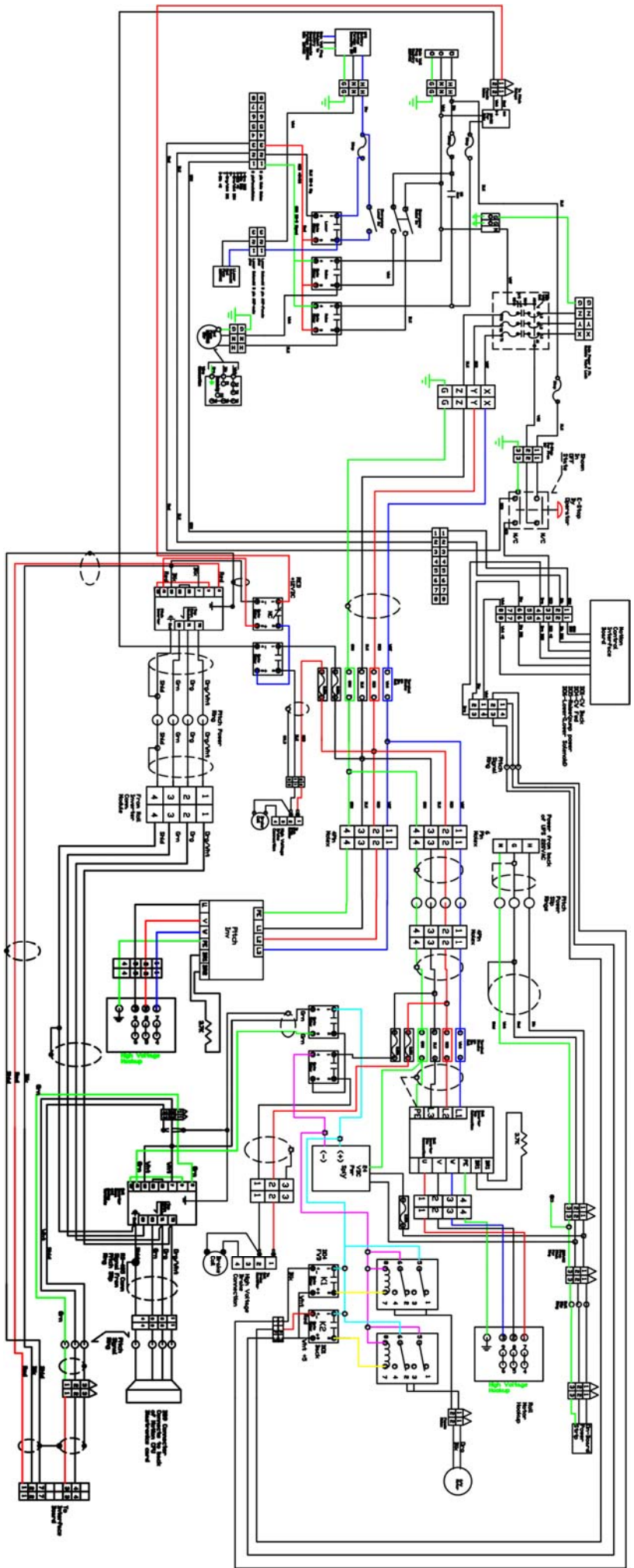
1. Confirm the motion computer; onboard computer and projector are powered on.
2. Connect to the onboard computer through the Tight VNC shortcut on the motion computer.
3. Click Start/Devices and Printers.
4. In the Devices and Printers window there is two HAPP UGCI USB Flying boards listed, right click on one of them and select Game Controller Settings.
5. In the Game Controllers window you will see two EP1 Interrupts listed, one for each seat/set of controls. NOTE: If you do not see two EP1 Interrupts listed there is a problem, check the USB connections from the onboard computer to the HAPP control boards.
6. Select one EP1 Interrupt and click on Properties, in this window you can test the function of the joystick, throttle and buttons.
7. To calibrate click on Settings/Calibrate then Next.
8. Sit in the machine and look at the projector screen, follow the Wizard through the calibration steps pressing one of the joystick buttons to advance through each step. Make sure to move the joystick as far as it will go in all directions when calibrating.
9. At the end click Finish then Apply to save.
10. Test the joystick, make sure the + follows the joystick movements accurately and smoothly. (if it does not follow the joystick movement then repair to the wiring or replacement of potentiometers may be needed)
11. Test the throttle slider follows the throttle movement.
12. Select the other EP1 Interrupt and repeat the calibration steps, at the end close the Game Controllers window.
13. Close the onboard Tight VNC connection and test the joysticks in the games.

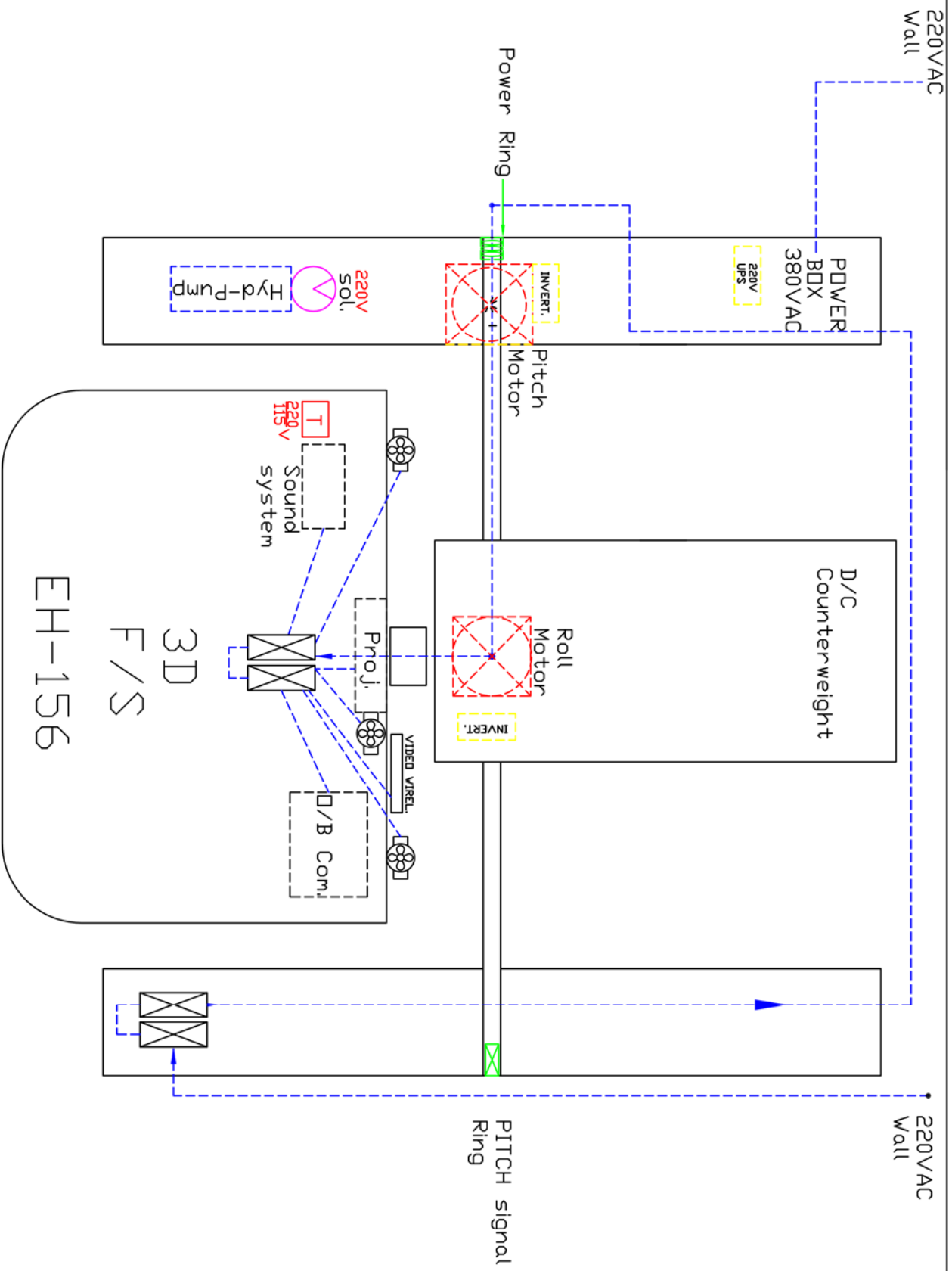
ELECTRICAL SHOP PRODUCTION UNIT

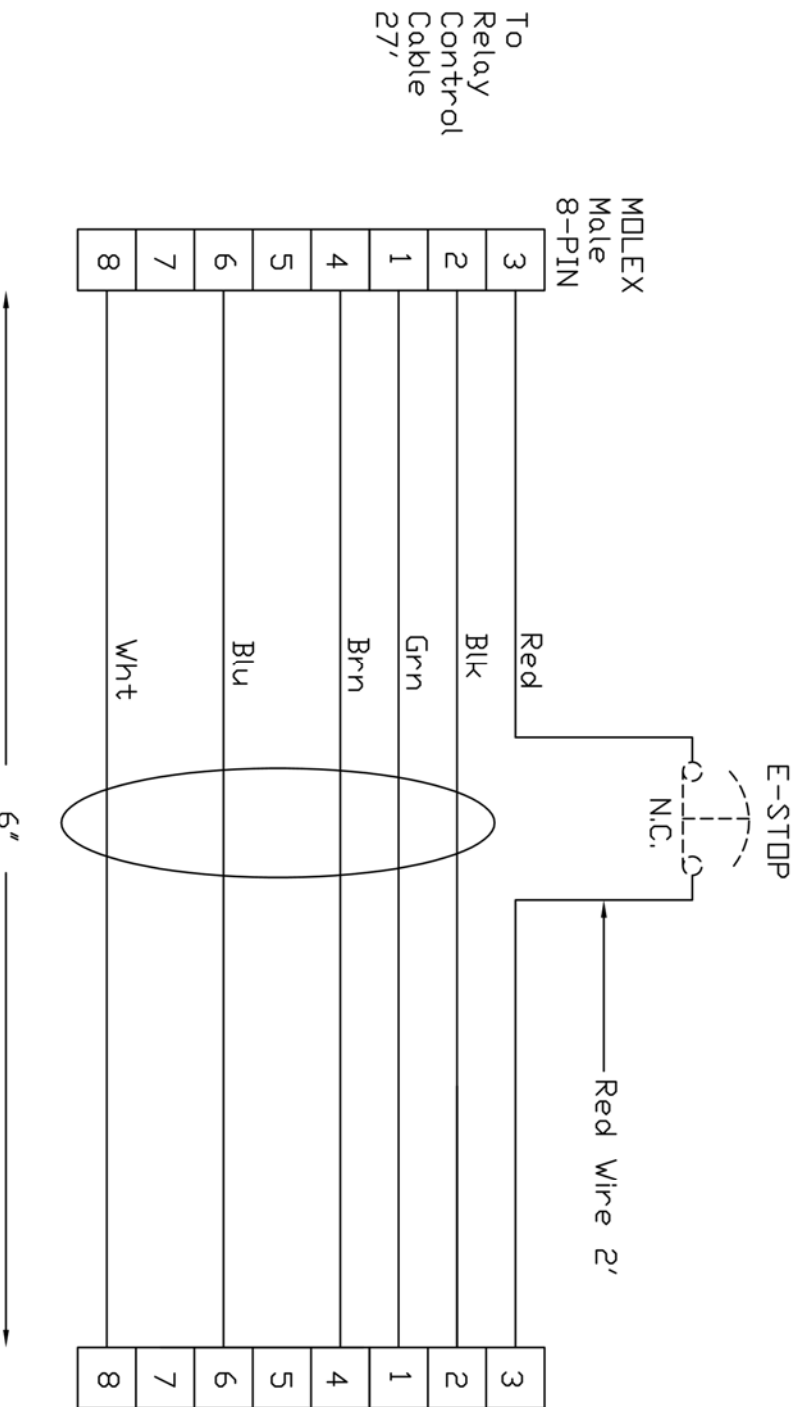
HIGH VOLTAGE

SA11051	DC C/W Motor		
SE11006-1	ROLL MOTOR CABLE	24"	
SE11007-1	PITCH POWER & BRAKE CABLE		
SE11009	MAIN POWER CABLE	20'	
SE11015	220V POWER CABLE	20'	
SE11016	DOWN SWICH & CABLE	5'	
SE11017L	UP LEFT SWITCH & CABLE	9'	
SE11017R	UP RIGHT SWITCH & CABLE	29'	
SE11019	COCKPIT E-STOP & CABLE		
SE11020	CANOPY OPEN SAFETY SWITCH & CABLE	6'	
SE11023	E-STOP A-FRAME	1'	
SE11036	COCKPIT POWER STRIP 110 volt or 220 volt		
SE11170	ROLL ENCODER ""		
SE11171	PITCH ENCODER ""		
SE11079	USB HAPP CONTROL for STAND-UP		
SE11080-1	USB HAPP CONTROL for COCKPIT		
SE11107-2	NETWORK CABLE	2'	
SE11107-30	NETWORK CABLE	30'	
SE11108-1	E-STOP CABLE	23'	
SE11111	CROTCH BELT CABLE & SWITCH	6'x2	
SE11117-1	MOTION CONTROL BOARD		
SE11124-1	PILOT SWITCH & CABLE	4'	
SE11158	POWER RING "JINPAT"		
SE11130-1	220V POWER CABLE	20'	
SE11131-1	PITCH SIGNAL RING		
SE11132	ROLL SIGNAL RING		
SE11157	POWER BOX		
SE11136	CABLE ASSY PITCH & ROLL ANALOG	28'	
SE11139	RELAY SIGNAL CABLE	25'	
SE11140-1	PUMP SOLENOID CABLE 110 volt or 230V Coil		6'
SE11141	BRAKE RELEASE CABLE & SWITCH	4'	
SE11145	PITCH & ROLL INVERTER WIRING		
SE11146	BACK-UP CABLE	4'	
SE11147	PITCH MOTOR ELECTRICAL PANEL		
SE11149	PITCH ENCODER EXTENTION CABLE	20'	
EH0023	PUMP MOTOR POWER CABLE	6'	
SE19001	JOYSTICK CONTROL for STAND-UP		
SE19002	JOYSTICK CONTROL for COCKPIT		
SE20001	THROTTLE CONTROL for COCKPIT		
SE20002	THROTTLE CONTROL for STAND-UP		
SE11154	Relays Shut-Off Adapter		
SE11155	Cockpit Speakers Extention Cable		

SE11161	Roll Invert. Network Wiring		
SE11163	Roll Motor Electric Panel		
	220V POWER CABLE		
	Pitch Inverter Analog		
	Roll Inverter Analog		
	A Frame Power Strip		

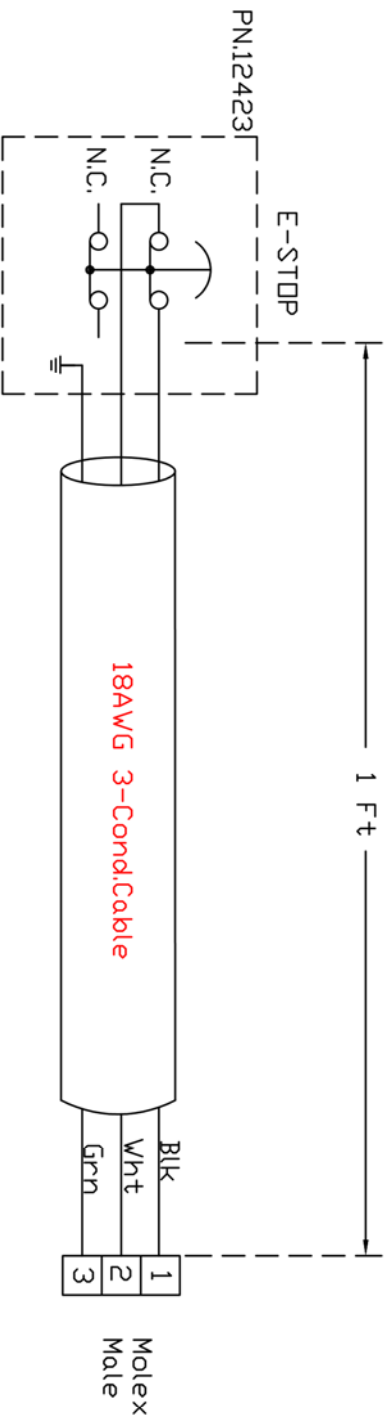






Cable PN.11184

MaxFlight Co. 1 Executive Dr. Toms River NJ 08755			
Title Relay Shut Off Adapter			
Document Number SE11154			
Size	DRAWN BY:	Rev	
A	CHECKED BY:		
DATE	MAR-02-2010	Sheet	1 of 1



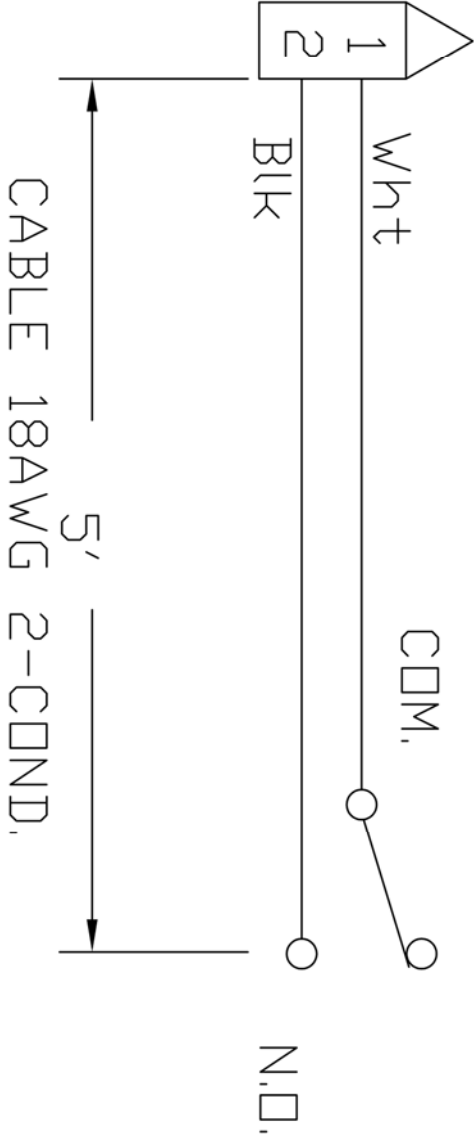
MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

E-Stop Command Assembly

SE11023

TITLE			
E-Stop Command Assembly			
DOCUMENT NUMBER			
SE11023			
SIZE			
DRAWN BY:		REV	
D.J.F.			
CHECKED BY:		APPROVED BY:	
DATE			
Aug.09,2010			

2-Pin
Molex
Male



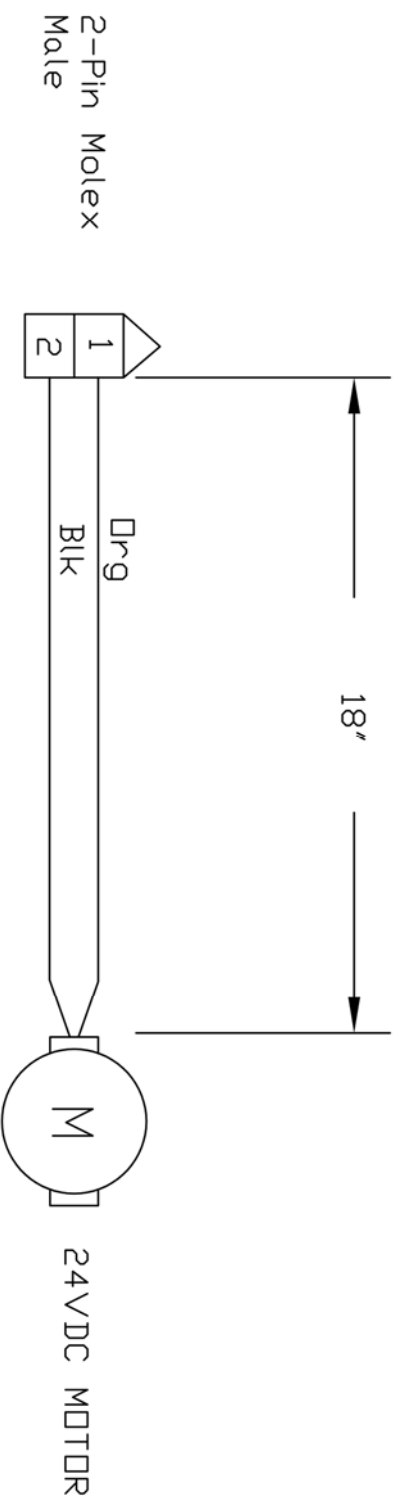
MaxFlight Co.
1 Executive Dr.
Toms River NJ 08755

TITLE Down Sensor

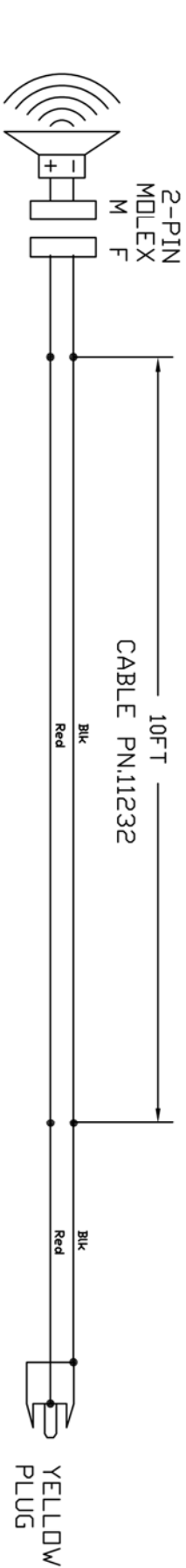
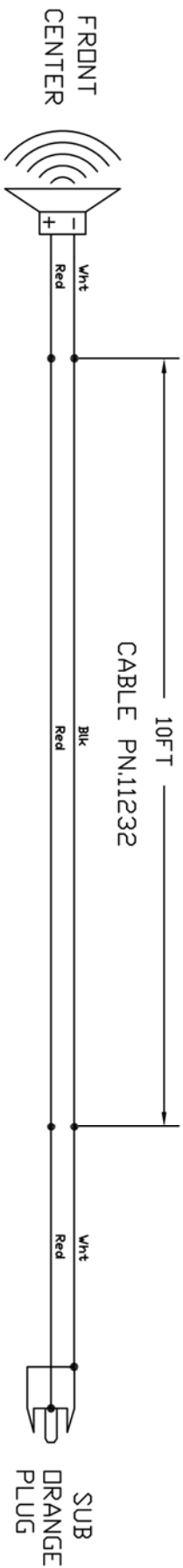
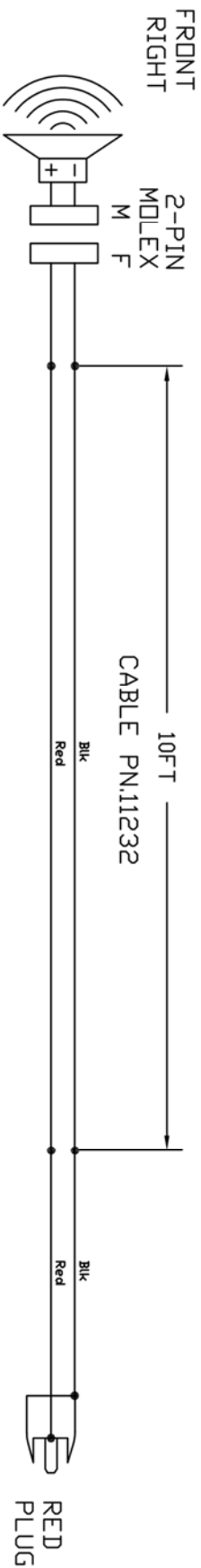
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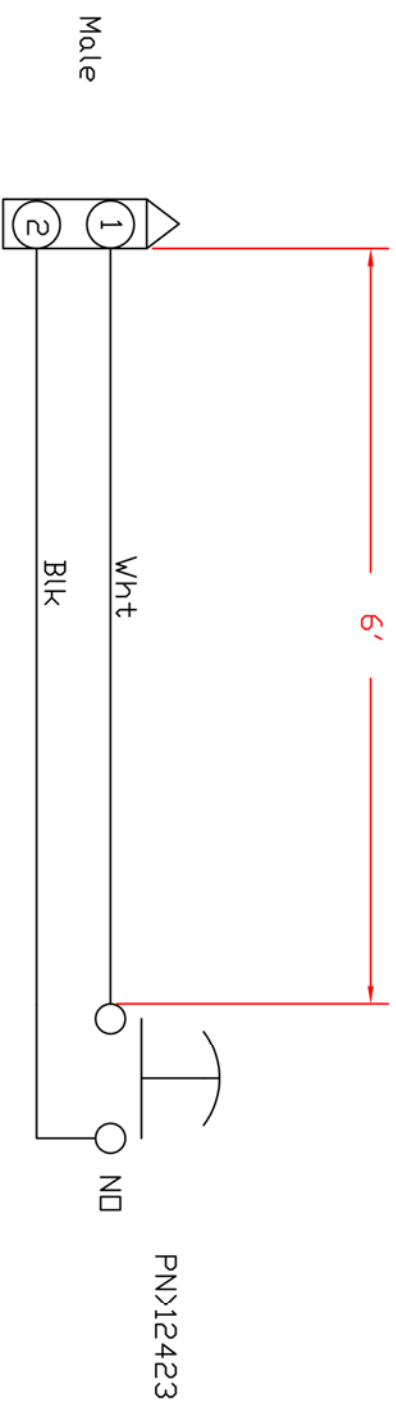
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11-12-2001			



MaxFlight Co. 1 Executive Dr. Toms River NJ 08755			
TITLE		COUNTERWEIGHT DC MOTOR	
DOCUMENT NUMBER		SA11051	
SIZE	DRAWN BY:	REV	
A	CHECKED BY:	APPROVED BY:	
DATE	02-13-2009		



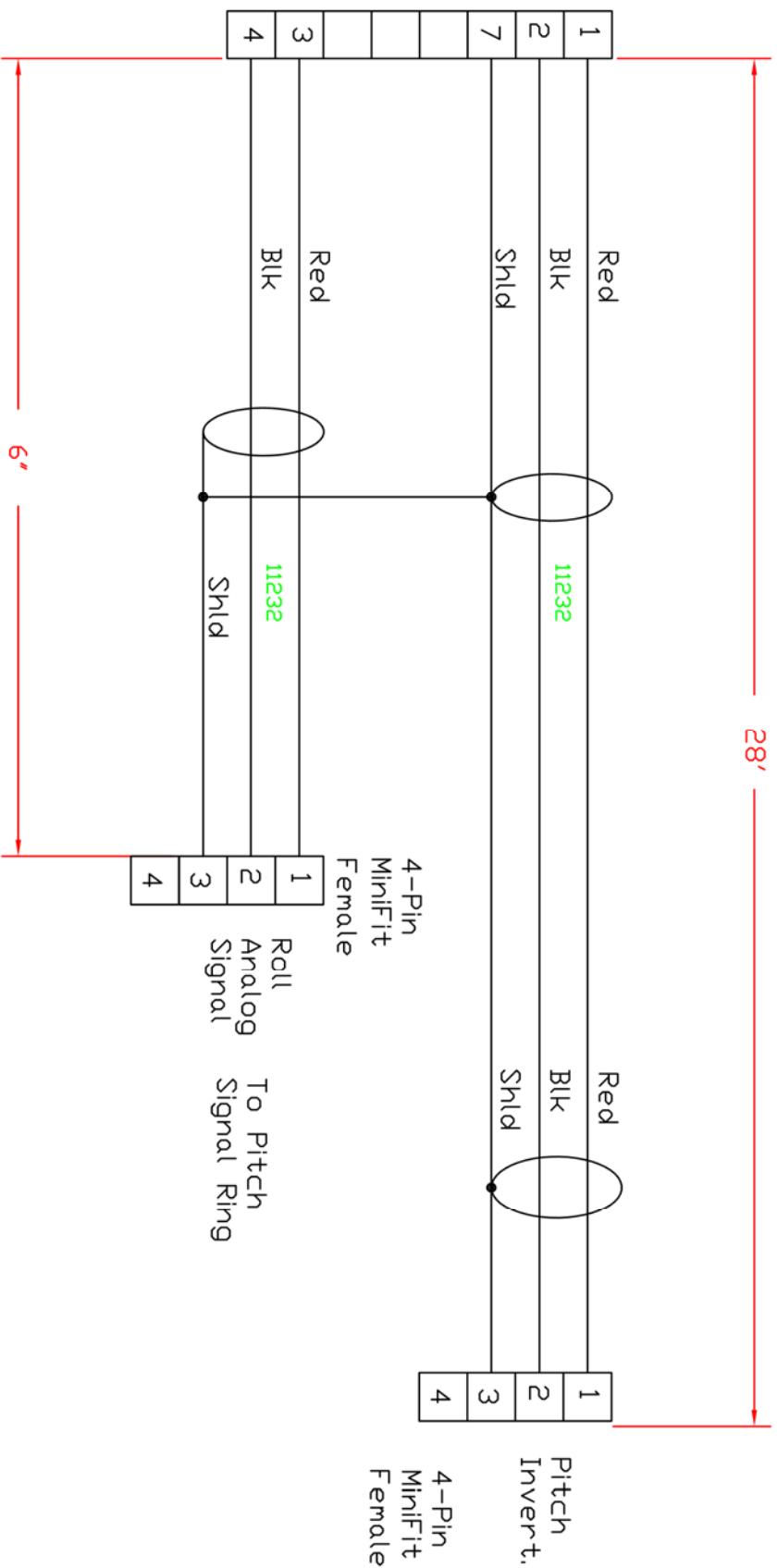
MaxFlight Co. 1 Executive Dr. Toms River NJ 08755			
TITLE Cockpit Spkrs. Electric			
DOCUMENT NUMBER SE11155			
SIZE A	DRAWN BY DHF	CHECKED BY	REV
DATE 05-25-2010	APPROVED BY		



MaxFlight Co. I Executive Dr. Toms River NJ 08755			
Title			
Cockpit E-Stop			
Document Number			
SE11019			
Size	DRAWN BY:	Rev	
A	CHECKED BY:	B	
DATE	03-12-2010	Sheet	of

Female
Molex
8-Pin

Motion
Control
Board



MANFLIGHT CORPORATION
I EXECUTIVE DR.
TOMS RIVER NJ 08755

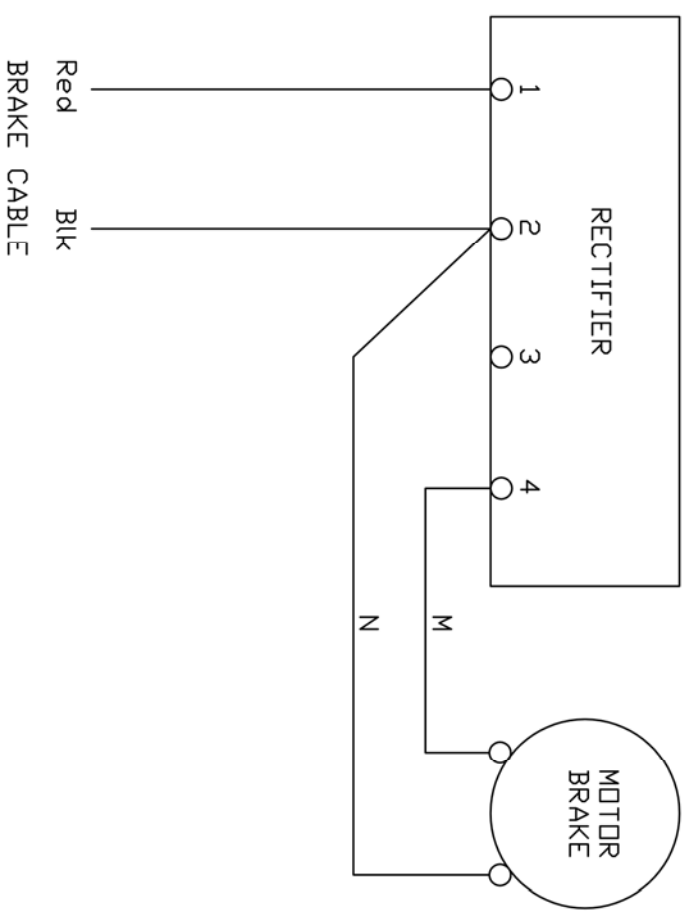
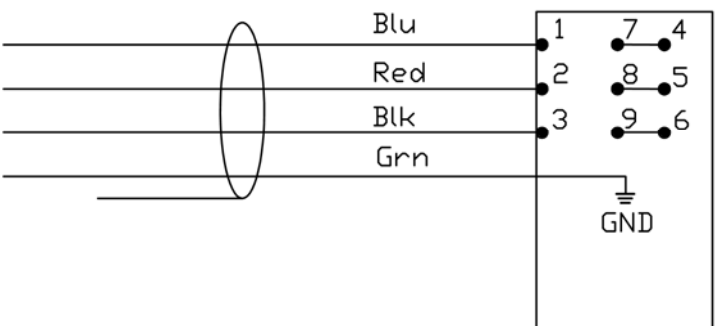
Title Cable Assy Pitch Analog Signal

Document Number SE11136

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A	CHECKED BY:	

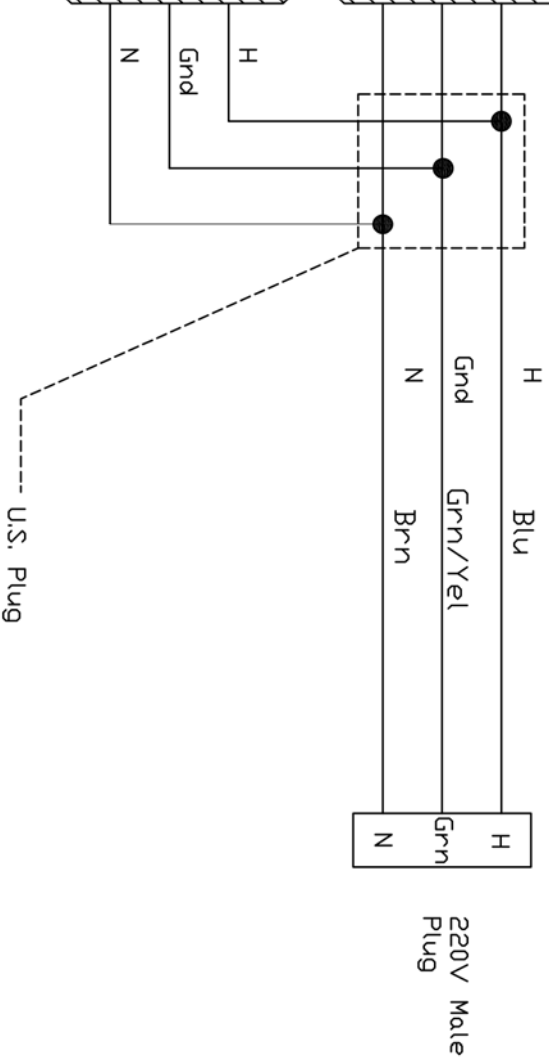
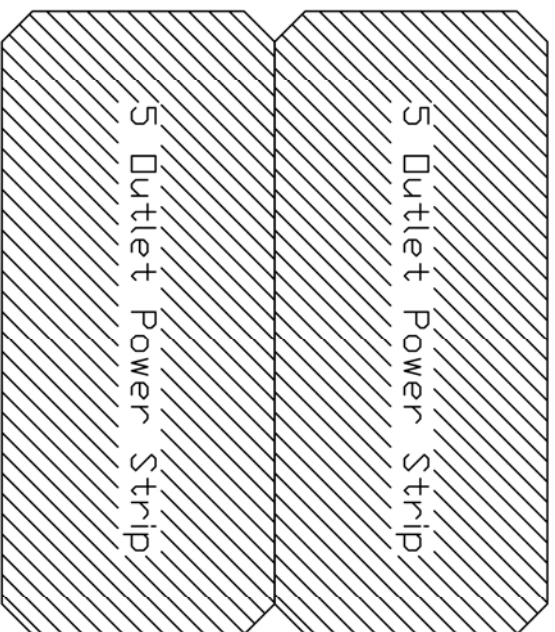
DATE	04-14-2011	Sheet	1 of 1
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PITCH,
ROLL
MOTOR



HIGH VOLTAGE MOTORS WIRING

220VAC



MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

Title "A" Frame Power Strip

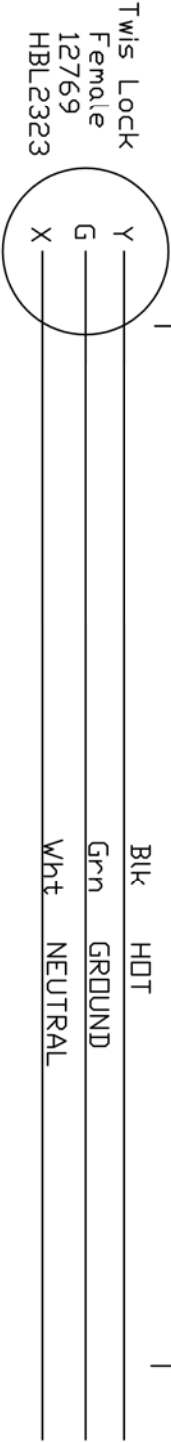
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Size	Drawn By:	Rev
A	DJH	

Checked By:	Approved By:

Date
03-24-2011

To Power Box



20'

Customer
Option

MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

TITLE 220 VAC WALL CABLE

DOCUMENT NUMBER

SIZE

DRAWN BY,

CHECKED BY,

APPROVED BY,

REV

DATE

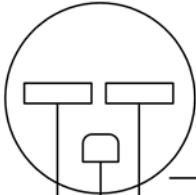
SHEET

Cable PN:10906

20'

To "A"Frame
Power Strip

Female
12758



Male Plug for
Country Option

MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

TITLE 220 VAC INPUT CABLE

DOCUMENT NUMBER

SIZE

DRAWN BY:

CHECKED BY:

DATE

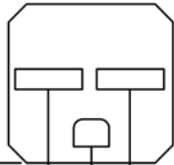
REV

APPROVED BY:

SHEET

Cockpit
Power,
220VAC

220 V
Female
12758



Blk

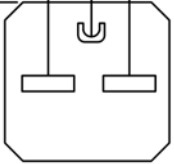
Grn

Wht

20'

CABLE PN.10906

220 V
MALE
12757



"A"Frame
Power
Strip

MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

TITLE 220 VAC COCKPIT POWER

DOCUMENT NUMBER SE11130

SIZE

DRAWN BY:

DJH

CHECKED BY:

APPROVED BY:

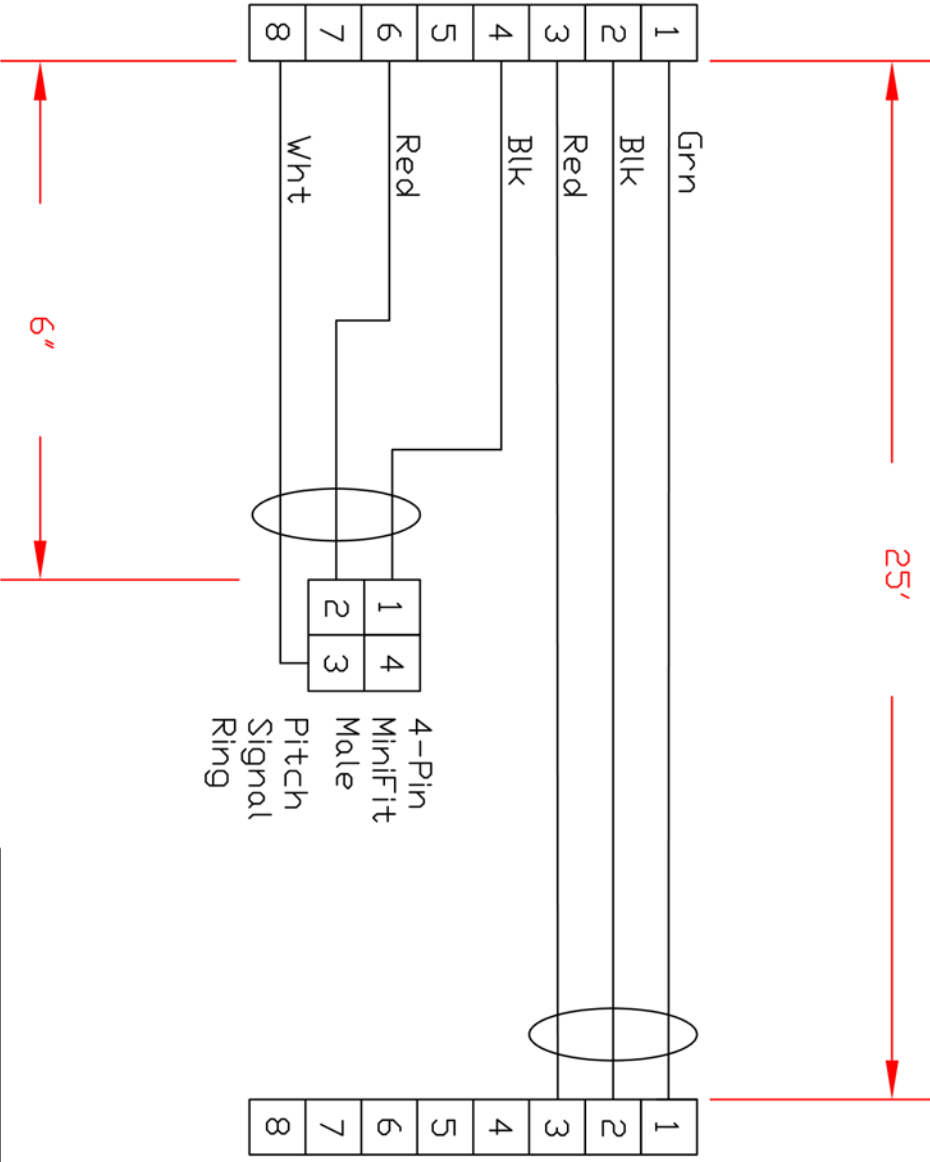
REV

DATE

03-24-2011

SHEET

8-Pin Molex
Female
Motion
Control
Board



8-Pin Molex
Female

Power Box

MaxFlight Co.
Executive Dr.
Toms River NJ 08755

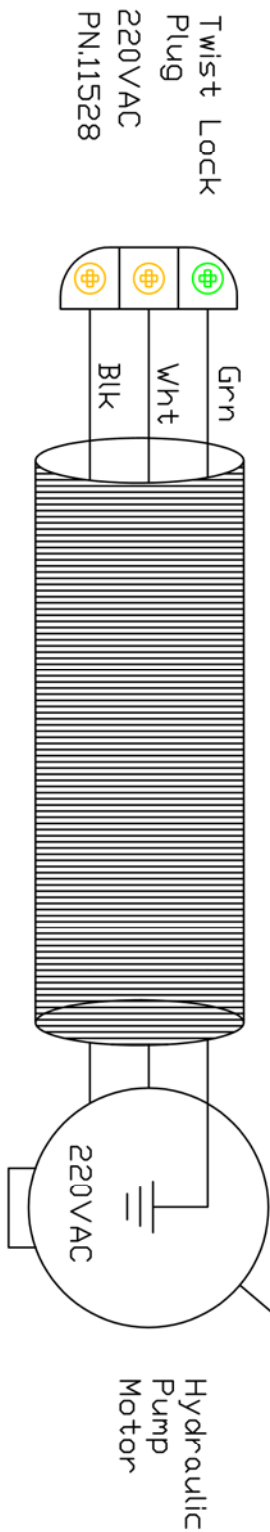
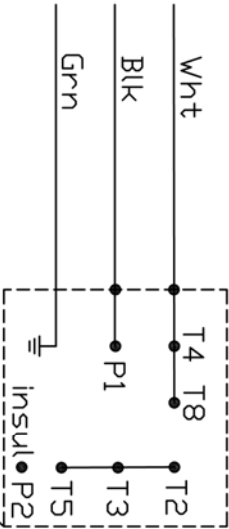
Title
Relay Signal Cable

DOCUMENT NUMBER
SE11139

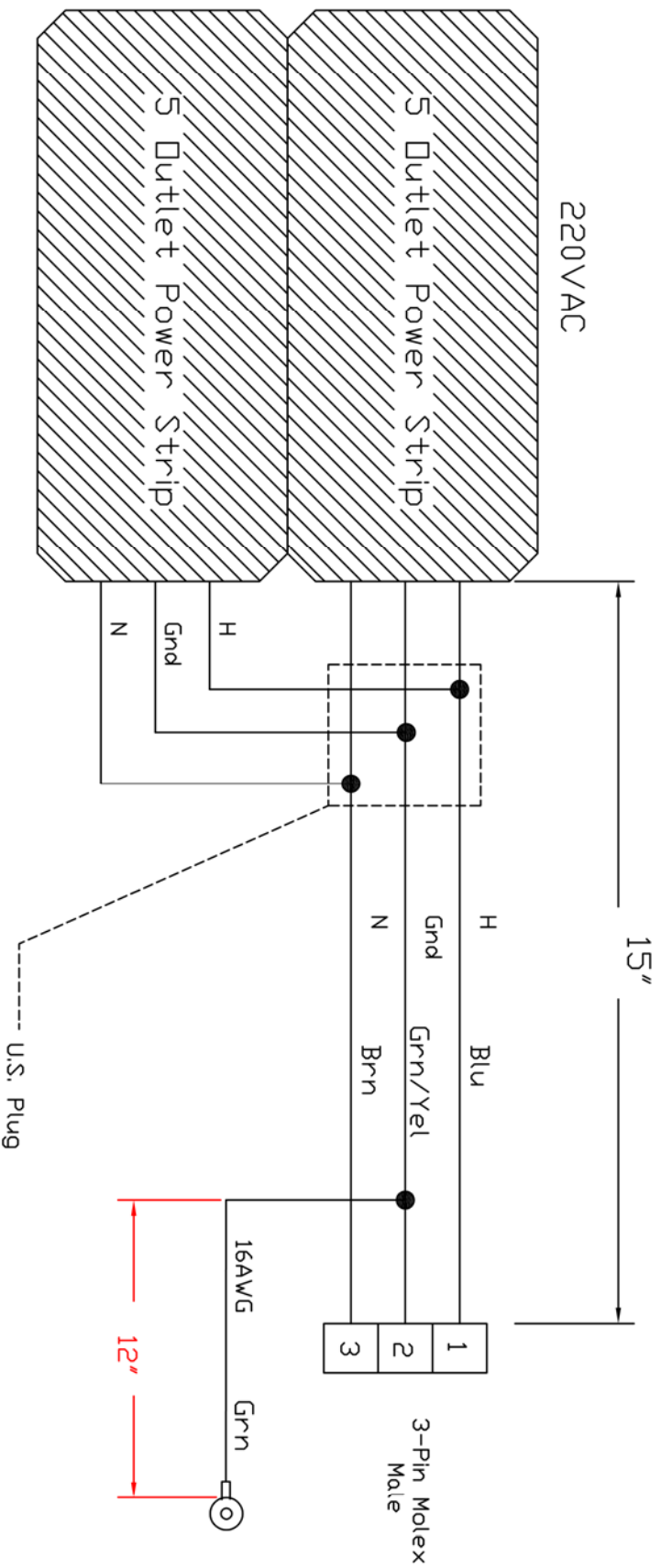
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DRAWN BY: DJH

CHECKED BY: APPROVED BY:

Date: 03-31-2011 Sheet of



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Title Pump Motor Power Cable			
Document Number EH0023			
Size	DRAWN BY:		Rev
A	CHECKED BY:		
DATE	07-22-2009		Sheet 1 of 1



MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

Title Power Strip Cockpit

Document Number SE11036

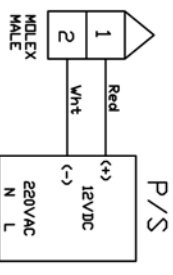
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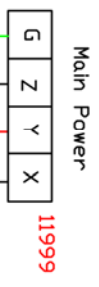
Date 10-15-2010

Rev

TO PITCH MOTOR
RELAYS



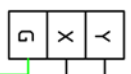
LC1D32M7
220V Coil



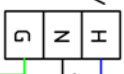
Emergency
Raise Sw-2



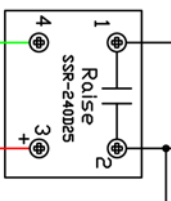
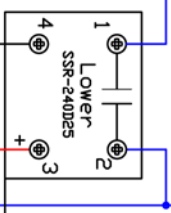
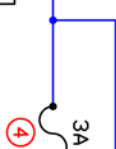
PN12767
Wall Power
220VAC
HBL2325



Battery
Backup
220VAC
Male
11530

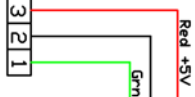


E-Lower
Sw-1



Relays Signal
8-Pin Molex Male
4 8 6 5 7 3 2 1

1-Grn
2-Blu/Wht
3-Red
+5V



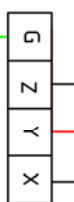
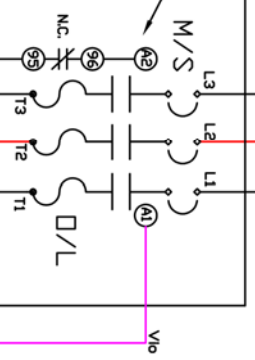
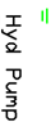
Lower
Solenoid
3 pin AMP
11956



RECEPTACLE
220 Twist
Lock
Female
PN11529



Hyd Pump
Power

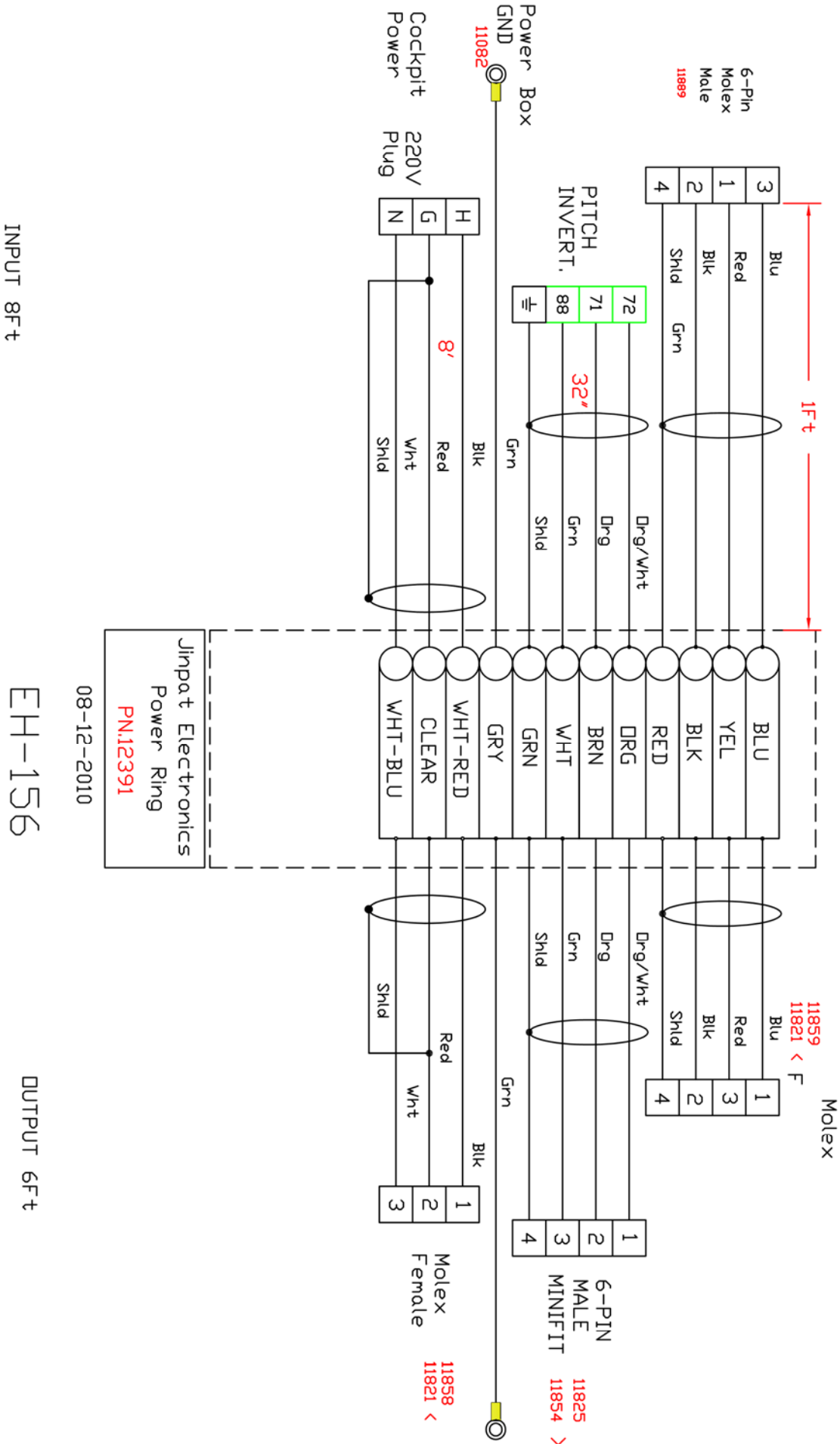


Pitch
Roll
Power
11998

E-STOP
3 pin
AMP
Male pins
11956



HIGH VOLTAGE
Power Box

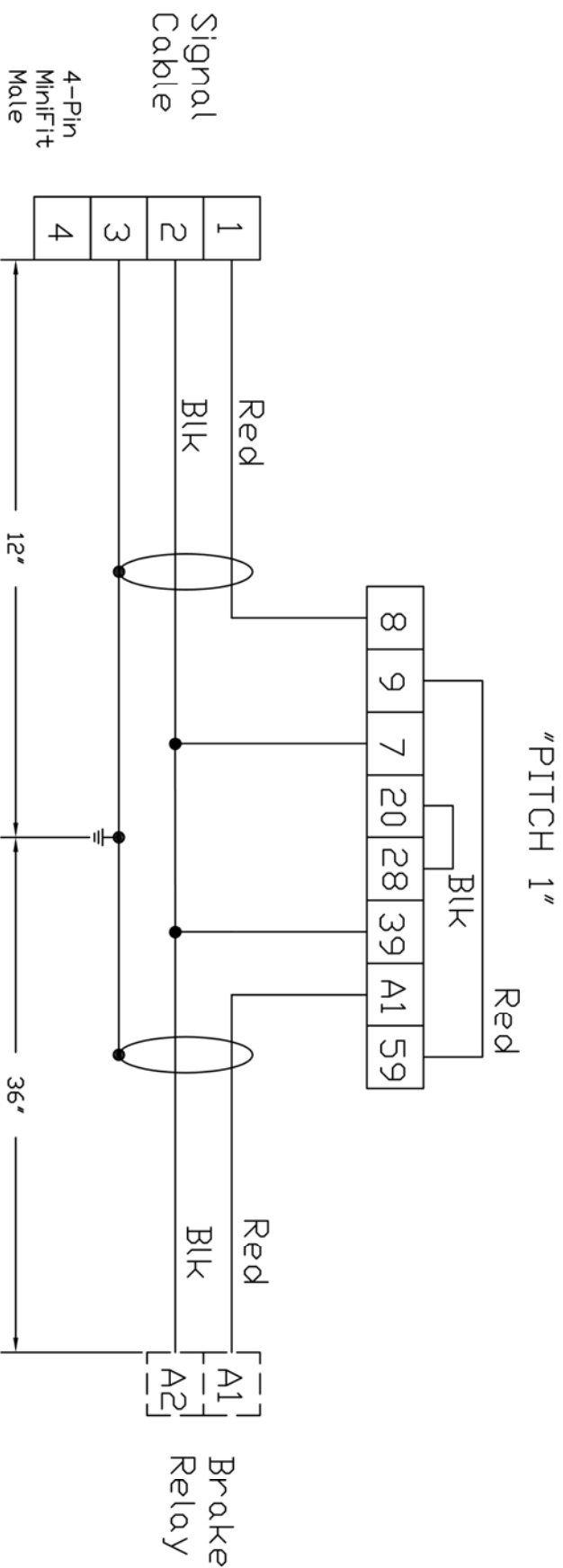


INPUT 8Ft

EH-156

OUTPUT 6Ft

SE11158



MaxFlight Co.
Executive Dr.
Toms River NJ 08755

Pitch Inverter Analog Wiring

DOCUMENT NUMBER

SIZE DRAWN BY: DJH

CHECKED BY: APPROVED BY:

DATE 03-31-2011

REV

Molex 8-Pin
Female

1
2
3
4
5
6
7
8

Blk

Red

Blu

Brn

Grn

Wht

Shld

Molex 8-Pin
Male

1
2
3
4
5
6
7
8

20'

Cable 22AWG Shield

MaxFlight Co.
1 Executive Dr.
Toms River NJ 08755

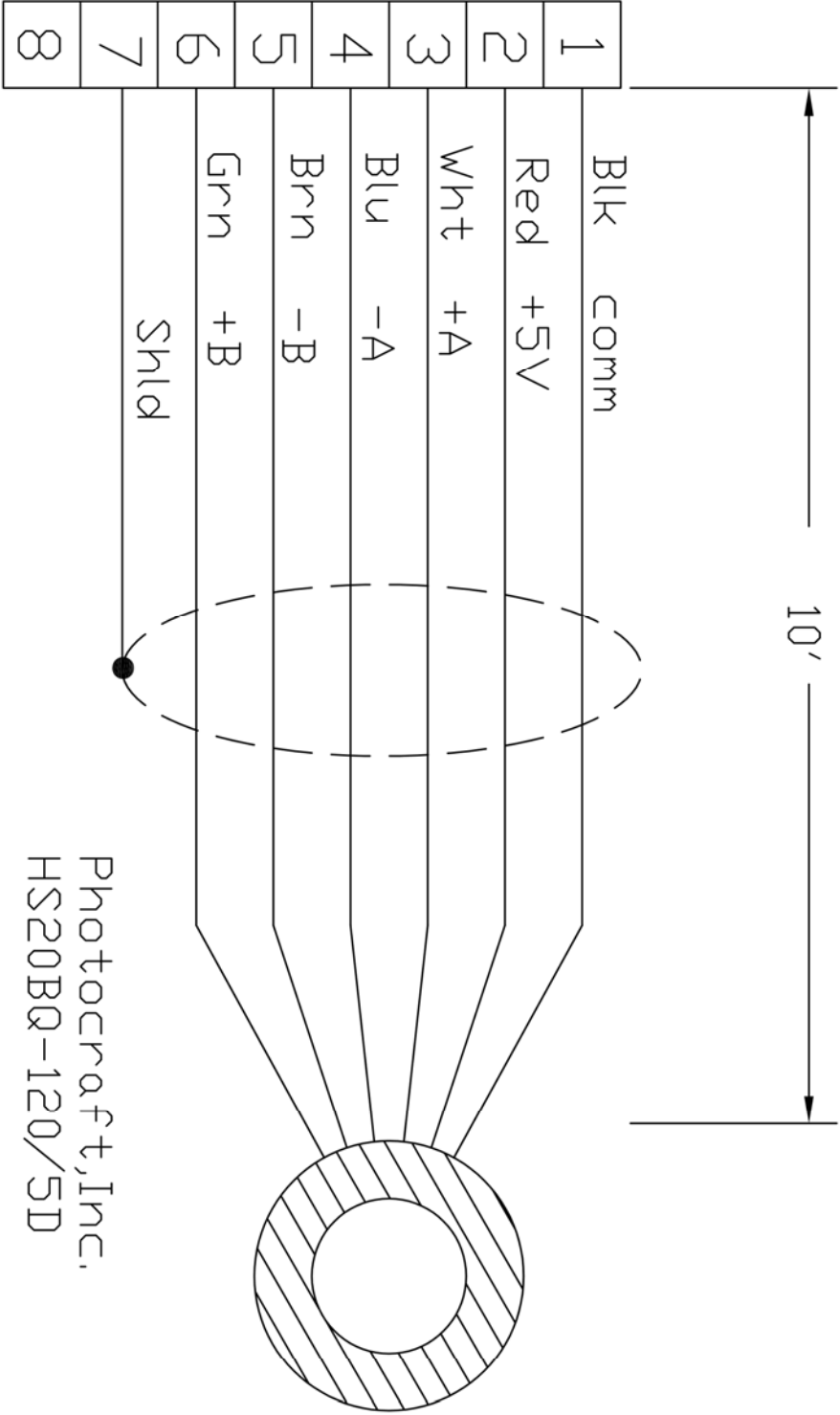
Title Pitch Encoder Extension Cable

DOCUMENT NUMBER SE11149

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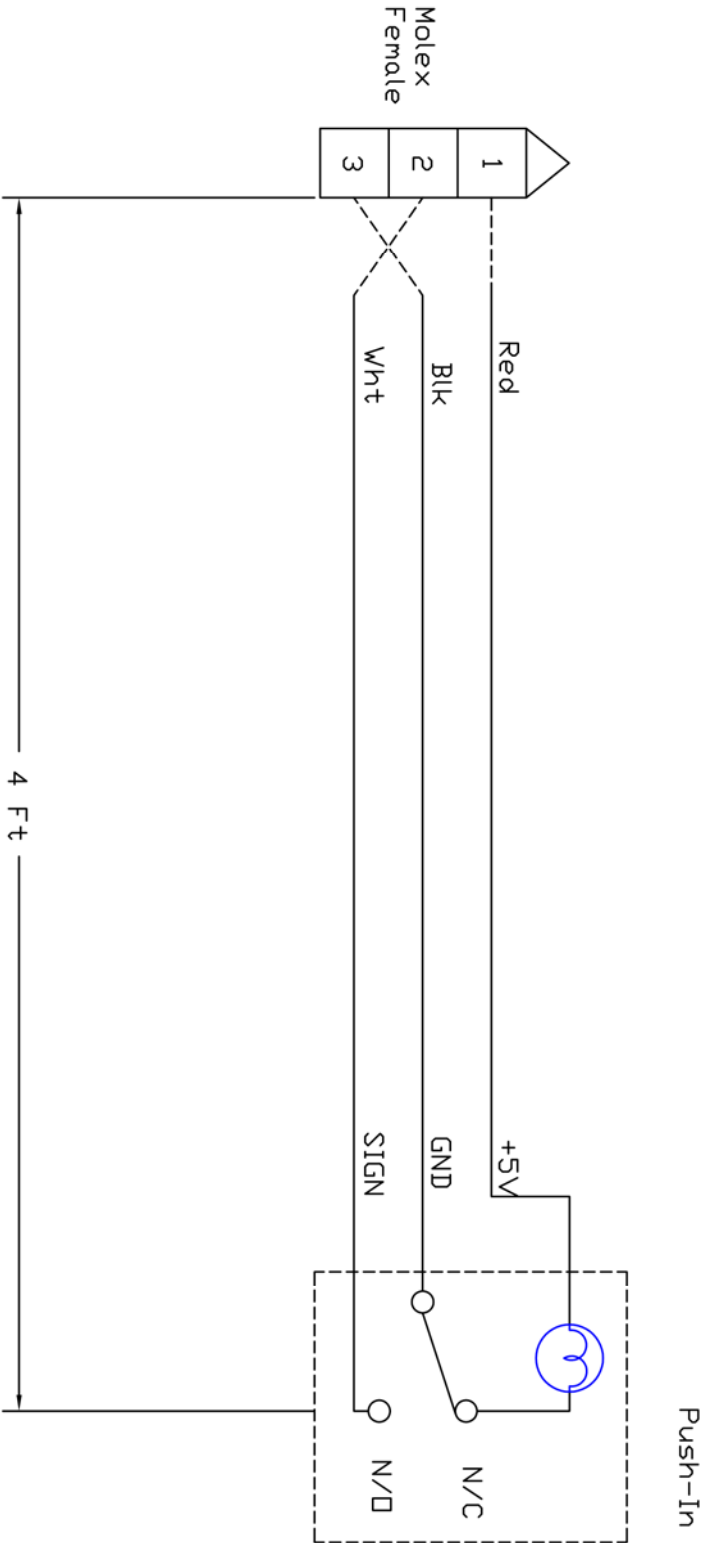
Date: 07-27-2009 Sheet 1 of 1

MOLEX
FEMALE



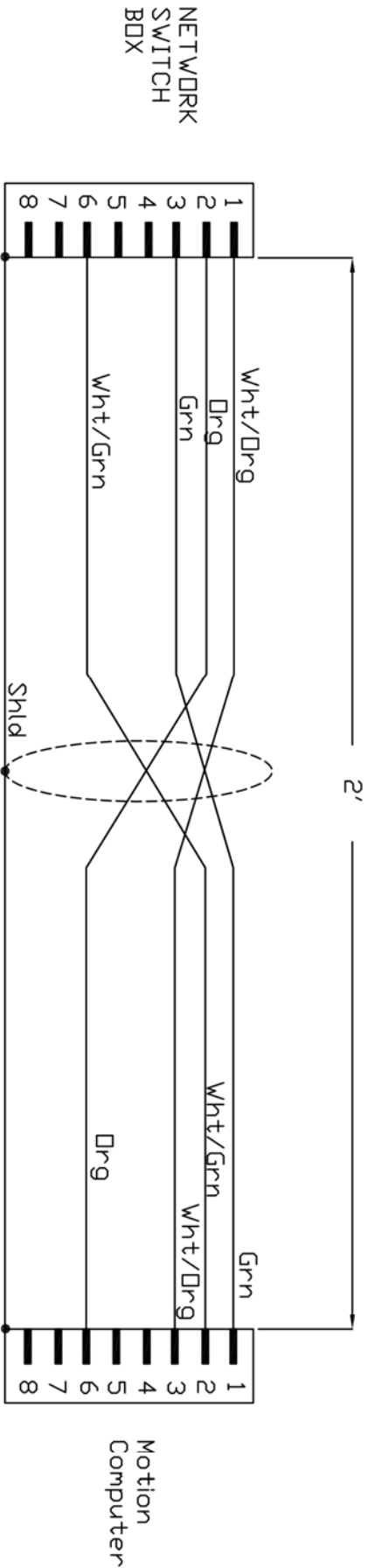
Photocraft, Inc.
HS20BQ-120/5D

MaxFlight Co.			
1 Executive Dr.			
Toms River NJ 08755			
Title Pitch Encoder			
DOCUMENT NUMBER SE11171			
SIZE	DRAWN BY:	DATE	Rev
A	234		
CHECKED BY:	APPROVED BY:		
Date:	06-28-2010	Sheet	of



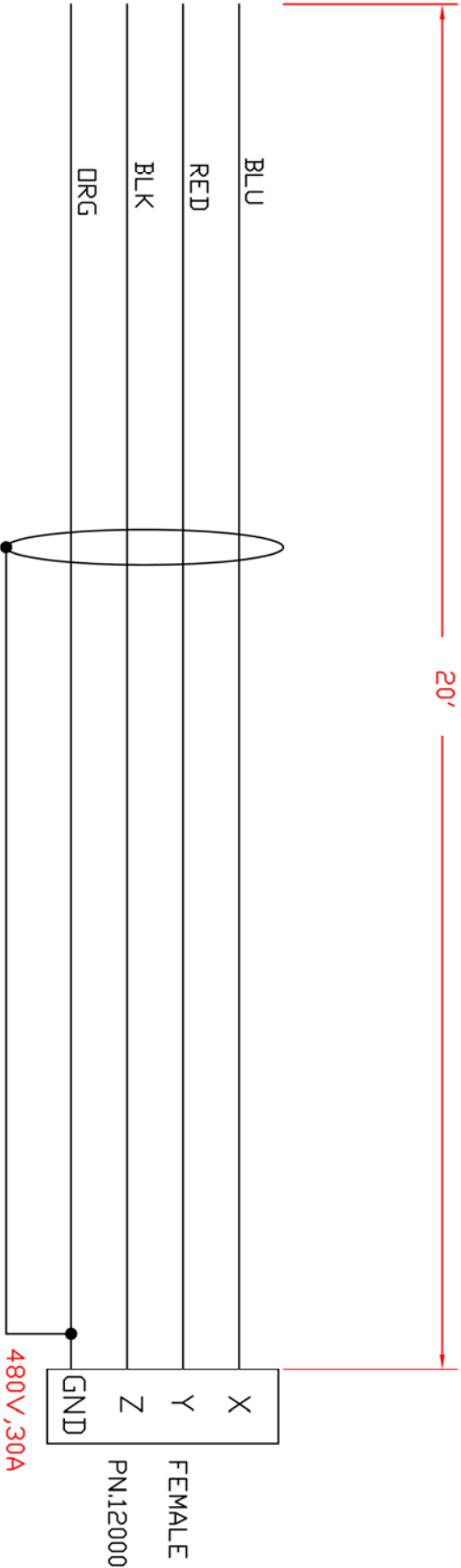
MaxFlight Co.
1 Executive Dr.
Toms River NJ 08755

TITLE				Pilot Control Button F/S	
DOCUMENT NUMBER				SE11124	
SIZE		DRAWN BY:		REV	
		CHECKED BY:		APPROVED BY:	
DATE					



CABLE 26AWG 4-COND.

MaxFlight Co. 1 Executive Dr. Toms River NJ 08755			
Title NETWORK CABLE 30'			
Document Number SE11107-30			
Size	DRAWN BY: <i>DJH</i>		Rev
A	CHECKED BY:		B
DATE	08-24-2009		Sheet of



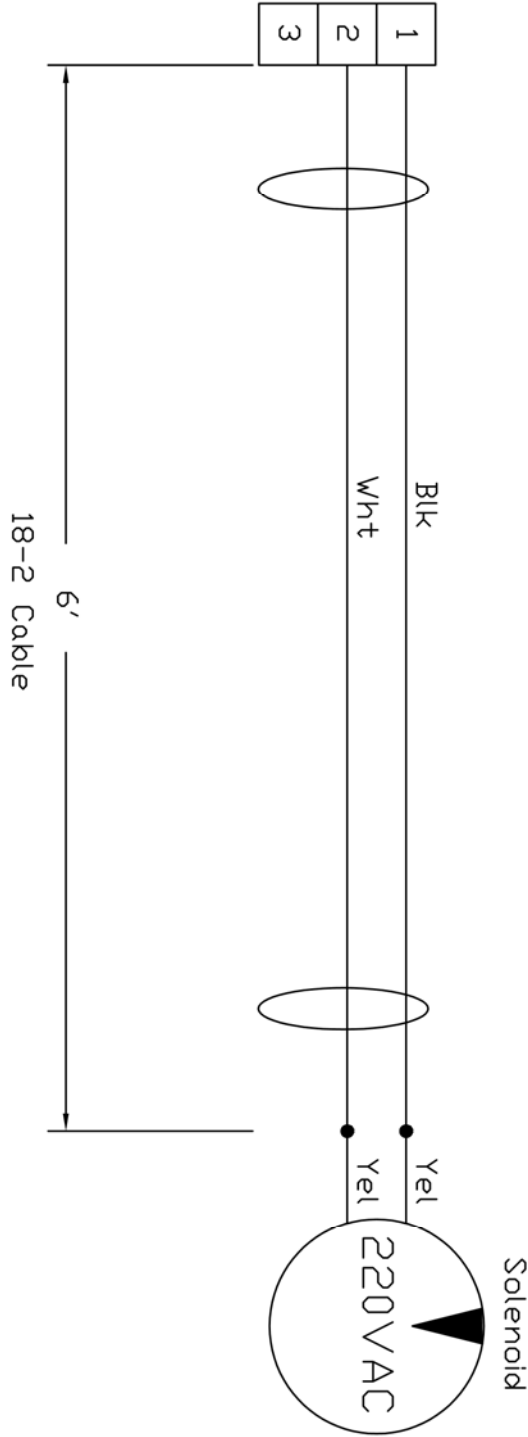
MaxFlight Co.
1 Executive Dr.
Toms River NJ 08755

TITLE MAIN AC POWER INPUT CABLE

DOCUMENT NUMBER SE11009

SIZE		REV	
DRAWN BY:		APPROVED BY:	
CHECKED BY:			
DATE			

AMP Male Plug
Male Pins
To Power
Box



MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

Title SOLENOID Cable

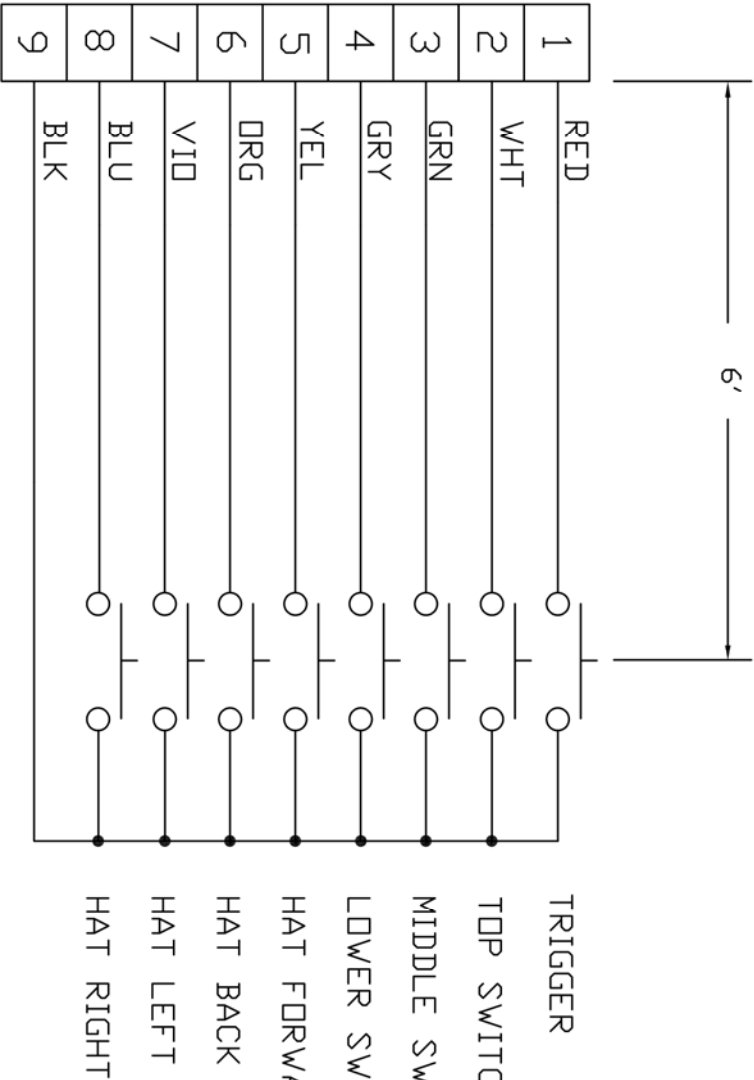
Document Number SE11140-1

Size	DRAWN BY:	APPROVED BY:	Rev
A	CHECKED BY:		

DATE	SHEET	1 of 1
01-06-2011		

10 PIN
MOLEX
FEMALE

5	10
4	9
3	8
2	7
1	6



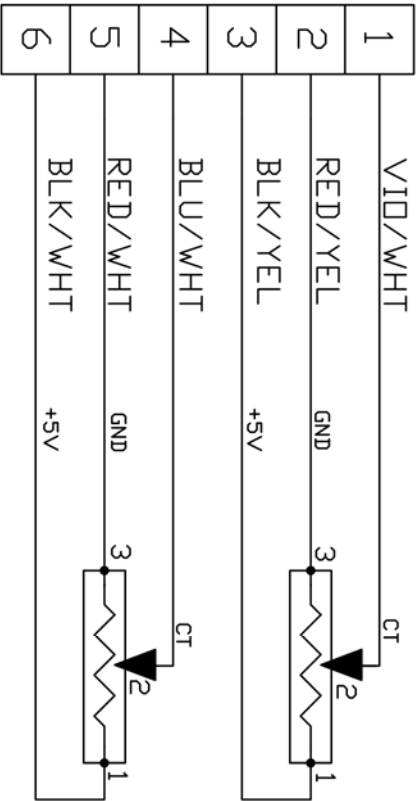
Cockpit x2

Roll

Pitch

4	1
5	2
6	3

6 PIN
MOLEX
FEMALE



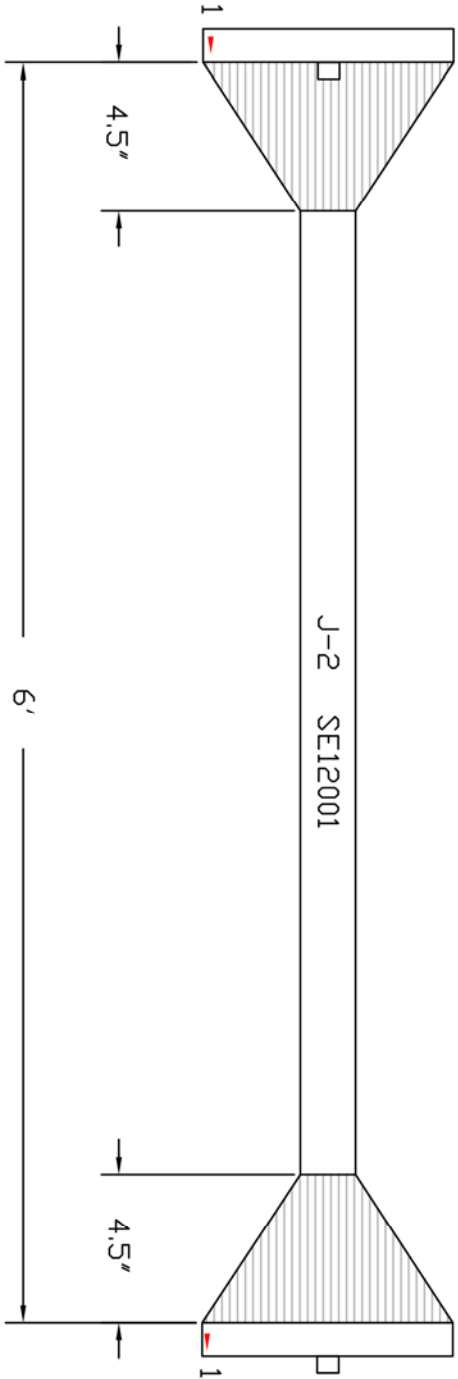
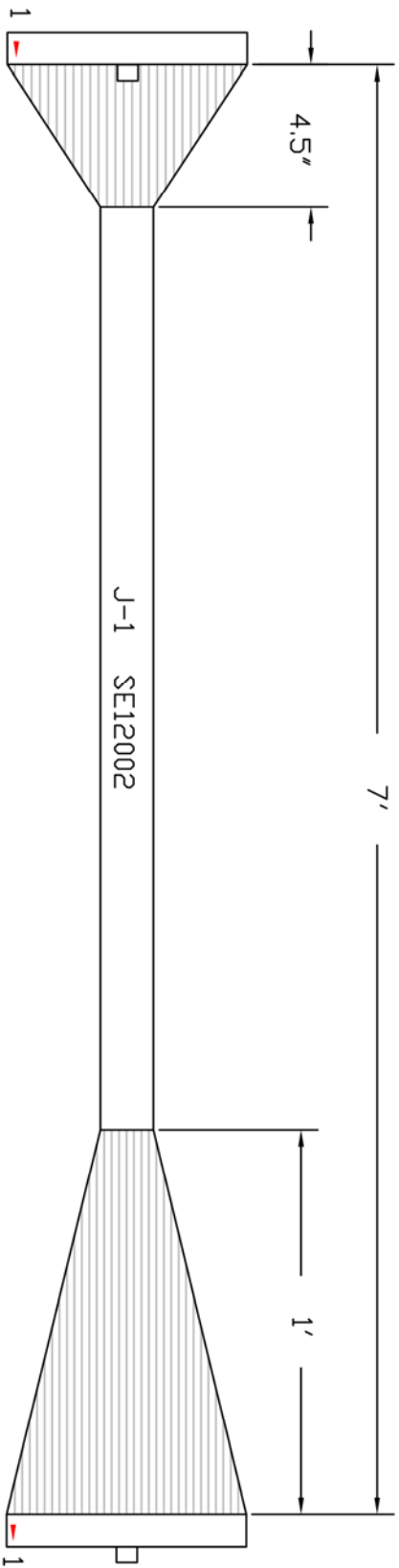
MaxFlight Co.
1 Executive Dr.
Toms River NJ 08755

TITLE Joystick FS2000

DOCUMENT NUMBER SE19001

SIZE	DRAWN BY:	REV
CHECKED BY:	APPROVED BY:	

DATE 05-25-2010

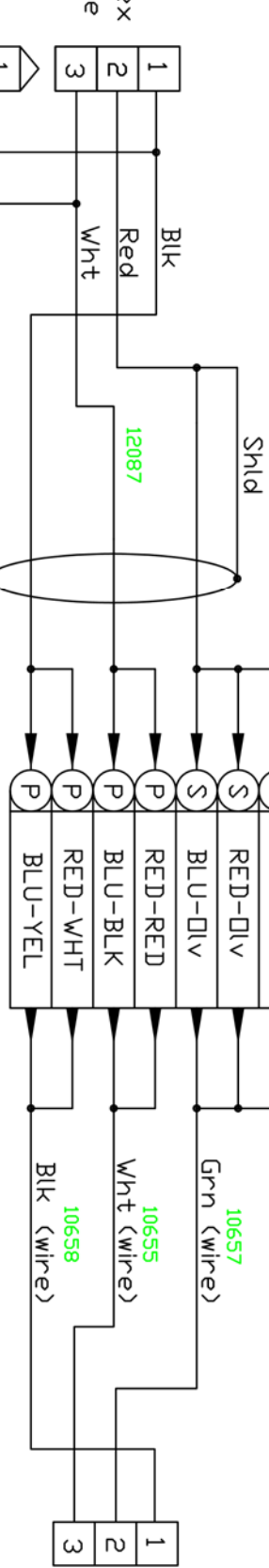
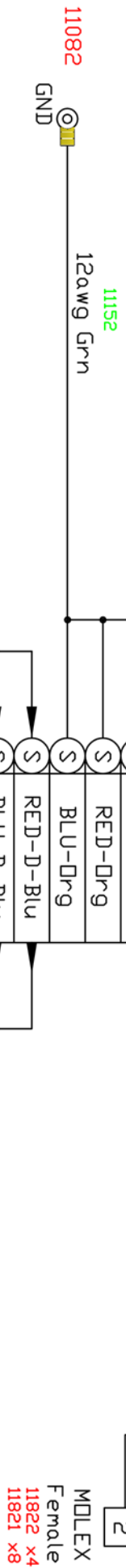
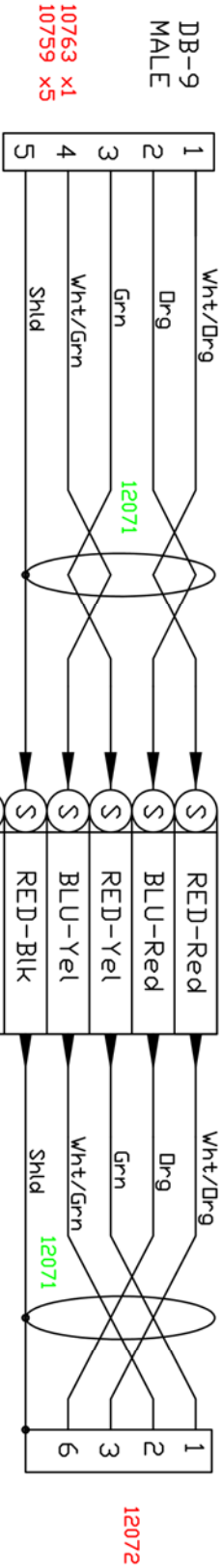


MaxFlight Co.
1 Executive Dr.
Toms River NJ 08755

Title J1 , J-2 Cable

Document Number SE12001 , SE12002

Size		DRAWN BY:		Rev
A	CHECKED BY:	APPROVED BY:		
DATE		Sheet		of



Roll Slip Ring

Input 3Ft

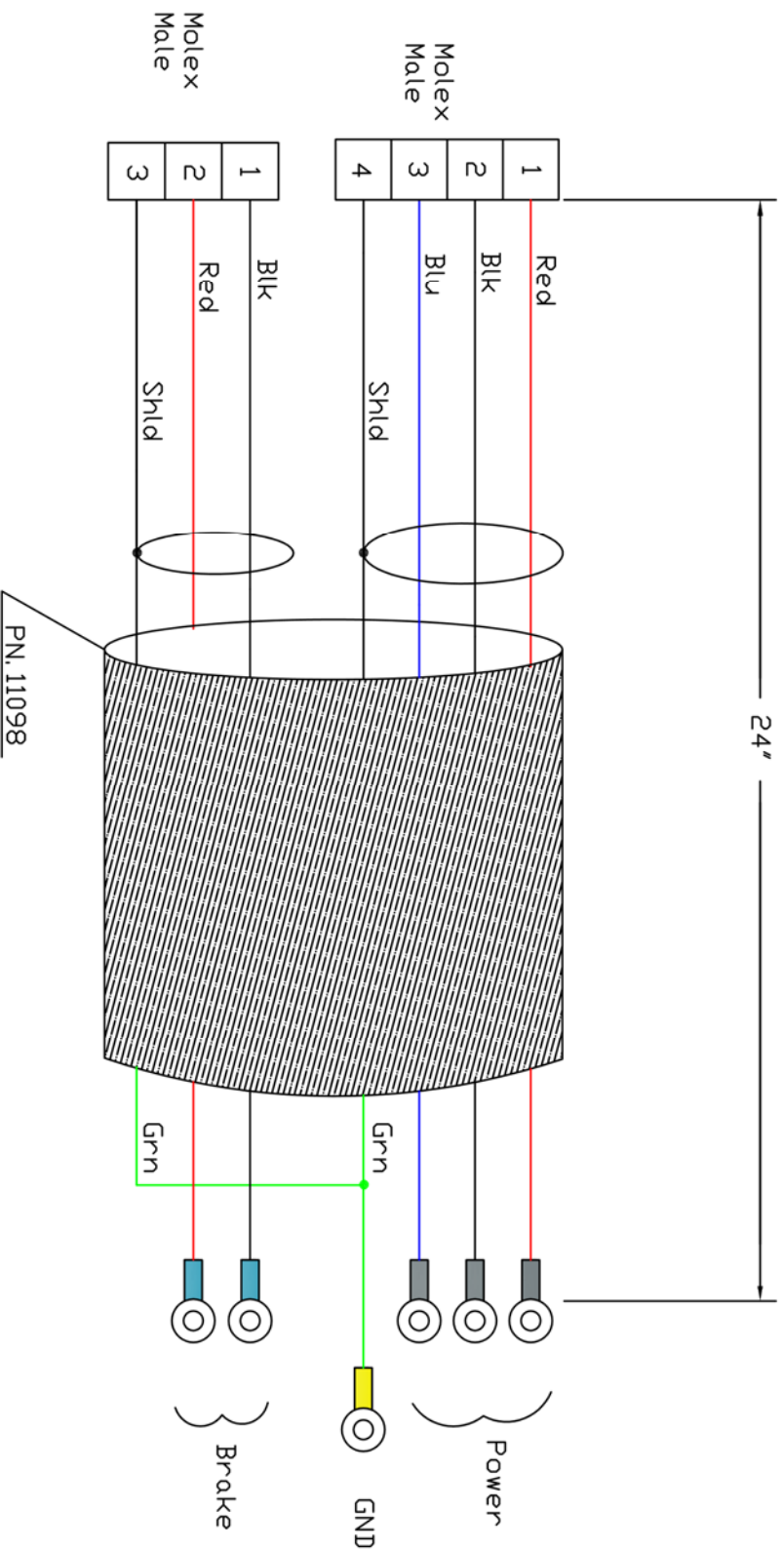
Output 7Ft

High Voltage

PN.12450

SE11132-1

H24+4



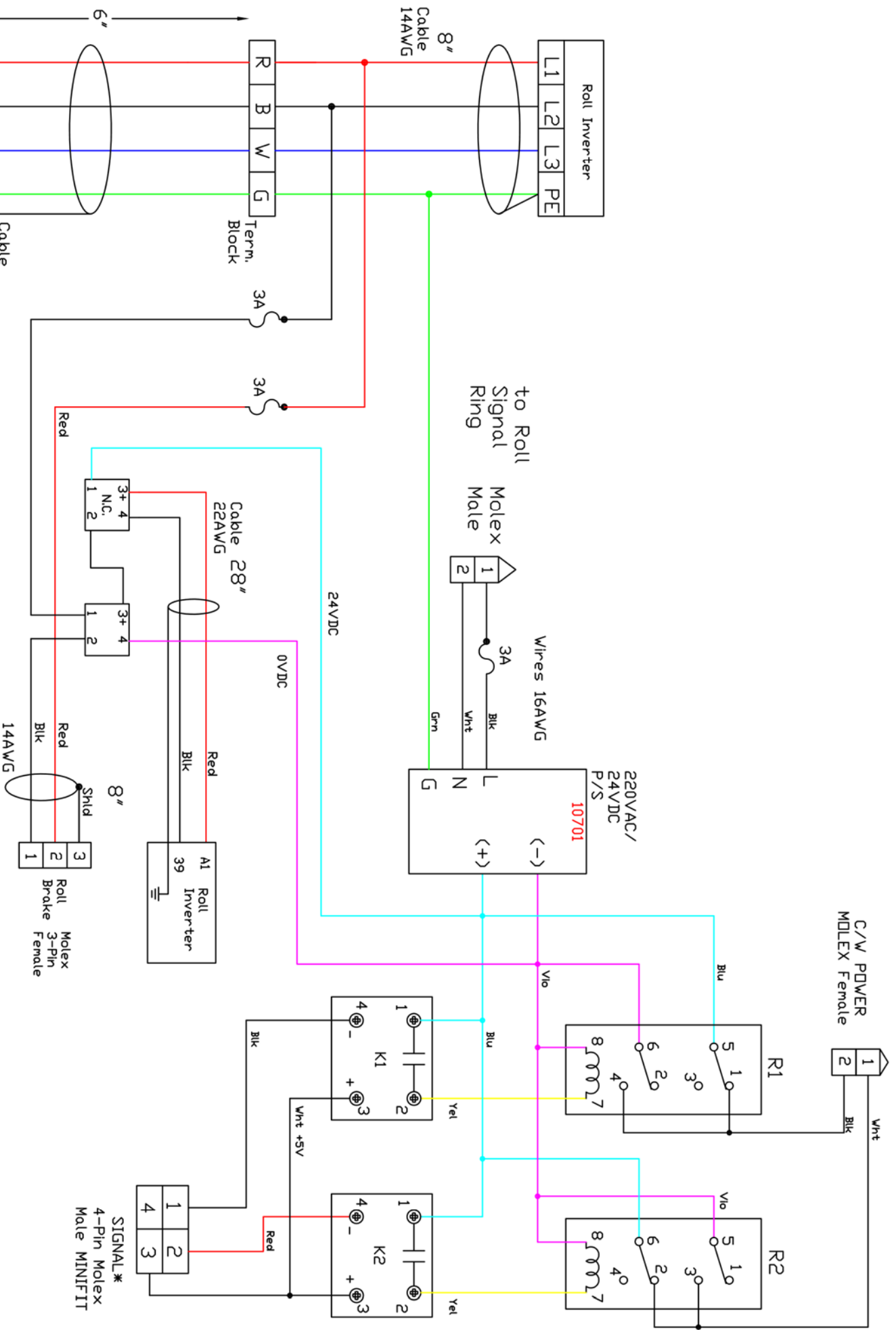
MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

TITLE Roll Power/Brake Short Pigtail

DOCUMENT NUMBER SE11006A

SIZE		REV
DRAWN BY:	DDH	
CHECKED BY:		APPROVED BY:

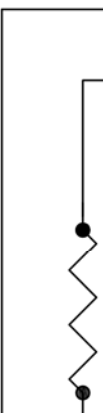
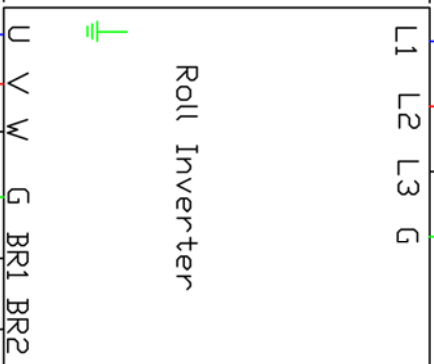
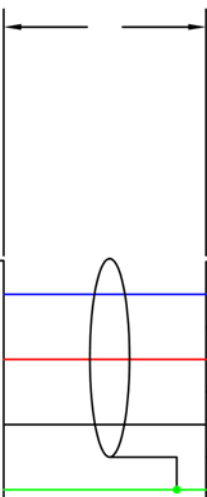
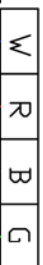
DATE 08-22-2009



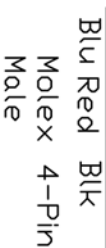
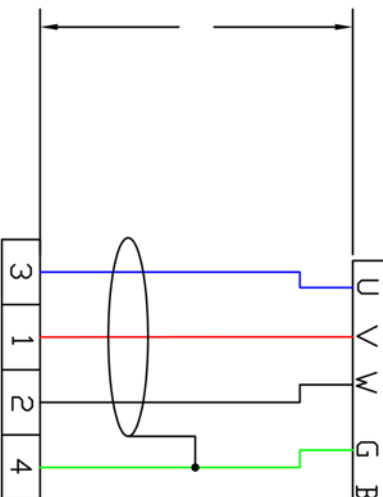
HIGH VOLTAGE

Title				ROLL MOTOR ELECTRICAL PANEL			
Document Number				SE11163-1			
Size	DRAWN BY:			DJH			
A	CHECKED BY:			APPROVED BY:			
DATE	03-31-2011			Sheet 1 of 1			

Terminal Block



Brake Resistor
3.7K



Title **ROLL INVERTER WIRING DIAGRAM**

Document Number

Size **DRAWN BY:**

A

CHECKED BY:

DATE

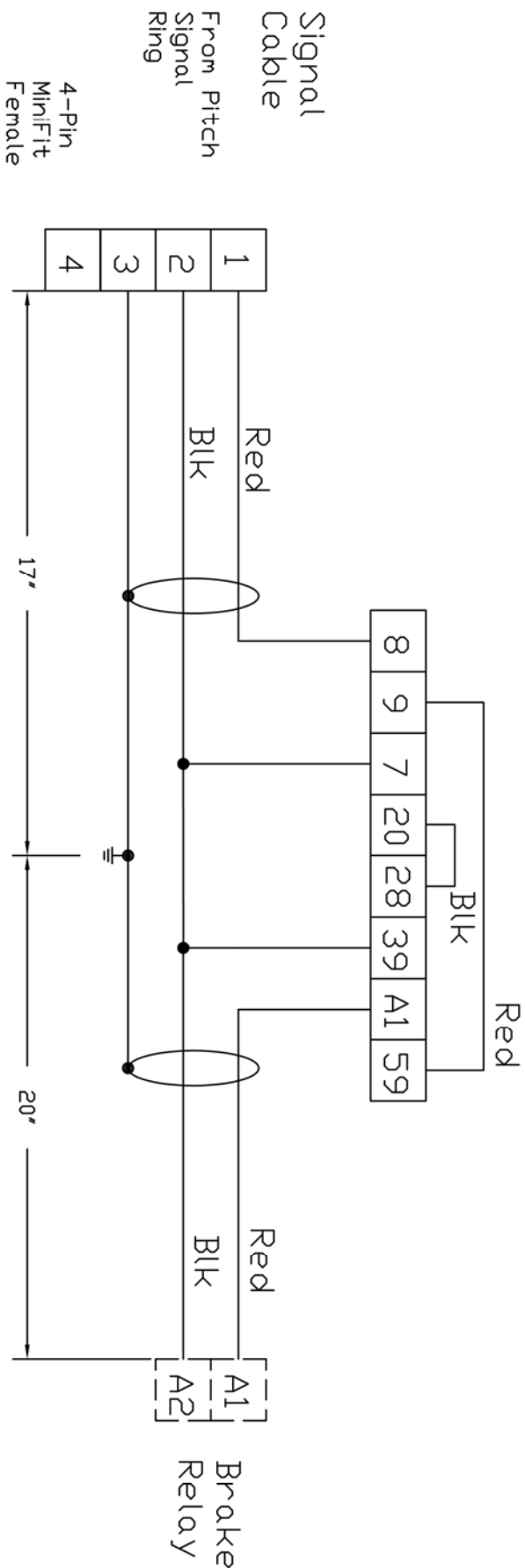
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Sheet of

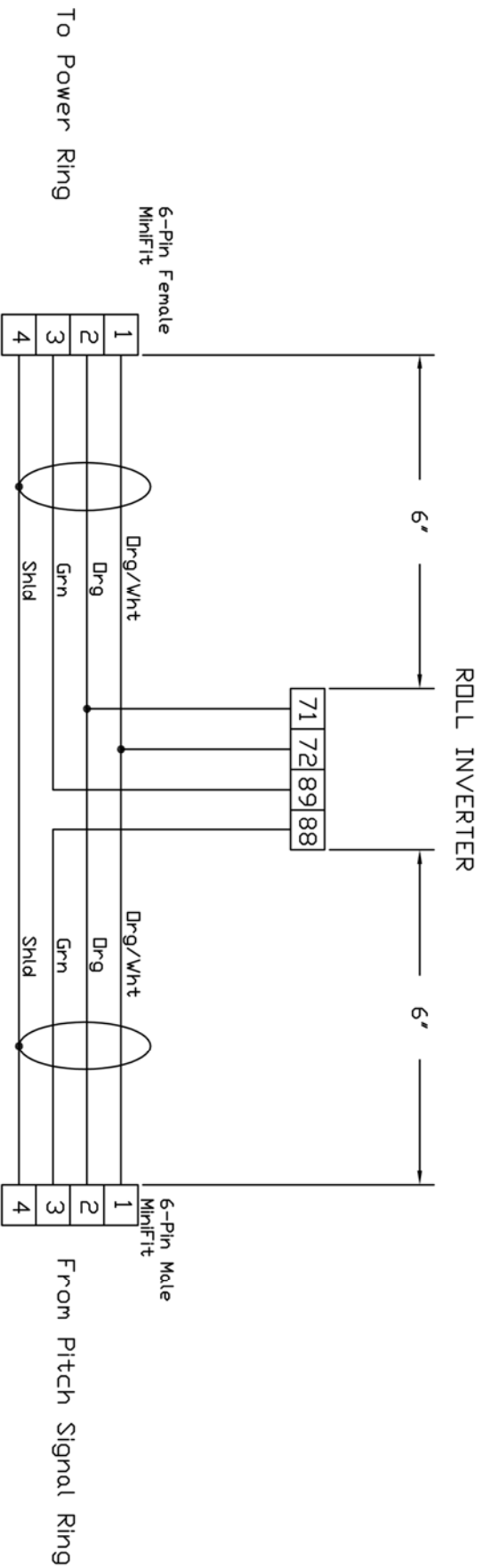
Rev

ED BY:

Roll
Inverter



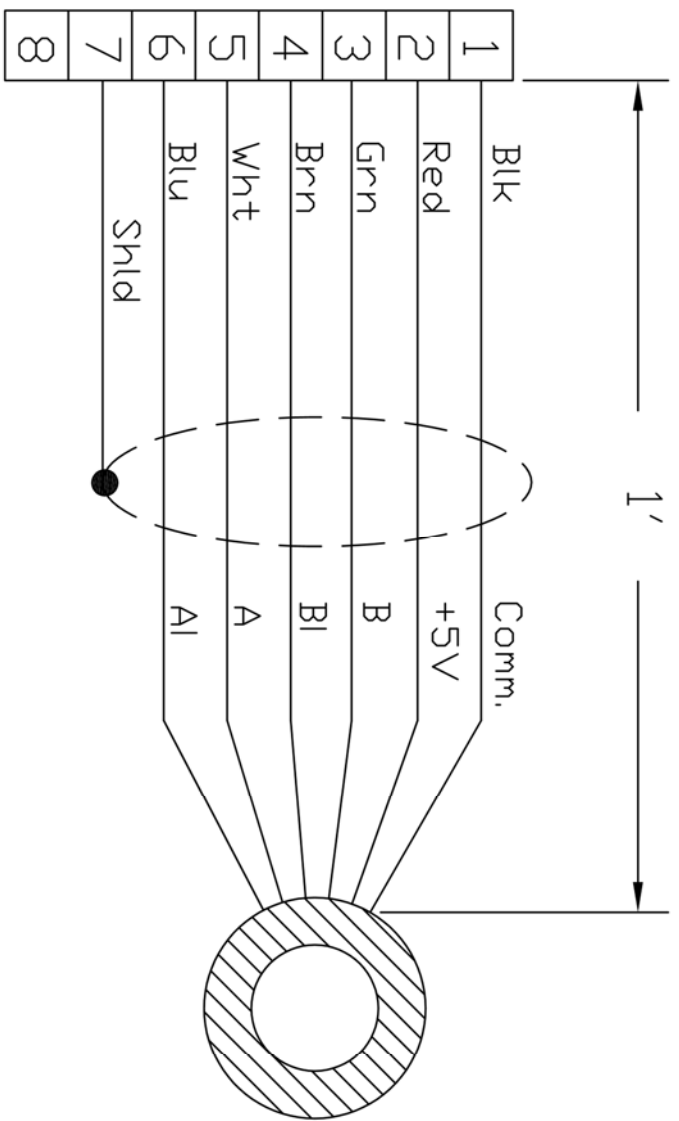
MaxFlight Co.	
I Executive Dr.	
Toms River NJ 08755	
TITLE Roll Inverter Analog Wiring	
DOCUMENT NUMBER	
SIZE	DRAWN BY: DJH
CHECKED BY:	APPROVED BY:
DATE 03-31-2011	REV A



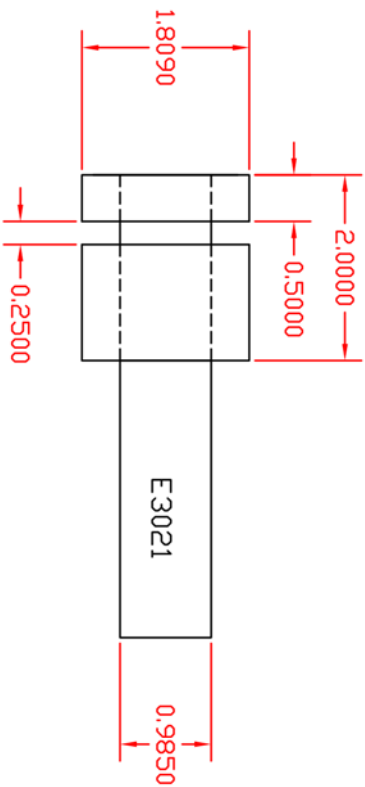
CABLE PN12701

MaxFlight Co. I Executive Dr. Toms River NJ 08755			
TITLE ROLL INVERTER COM. WIRING			
DOCUMENT NUMBER SE11161			
SIZE	DRAWN BY: <i>DJH</i>	REV	
CHECKED BY:	APPROVED BY:		
DATE 08-24-2010			

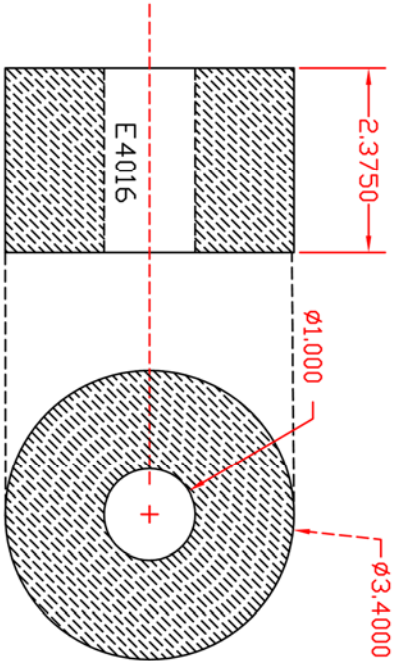
Molex
 Male
 11867 x1
 11854 x7



MaxFlight Co. 1 Executive Dr. Toms River NJ 08755			
Title Roll Encoder 'PHOTOCRAFT'			
DOCUMENT NUMBER SE11170			
SIZE	DRAWN BY: <i>gjh</i>	Rev	
CHECKED BY:	APPROVED BY:		
Date: 07-23-2010	Sheet	of	



POWER RING "JINPAT"



PITCH SIGNAL RING

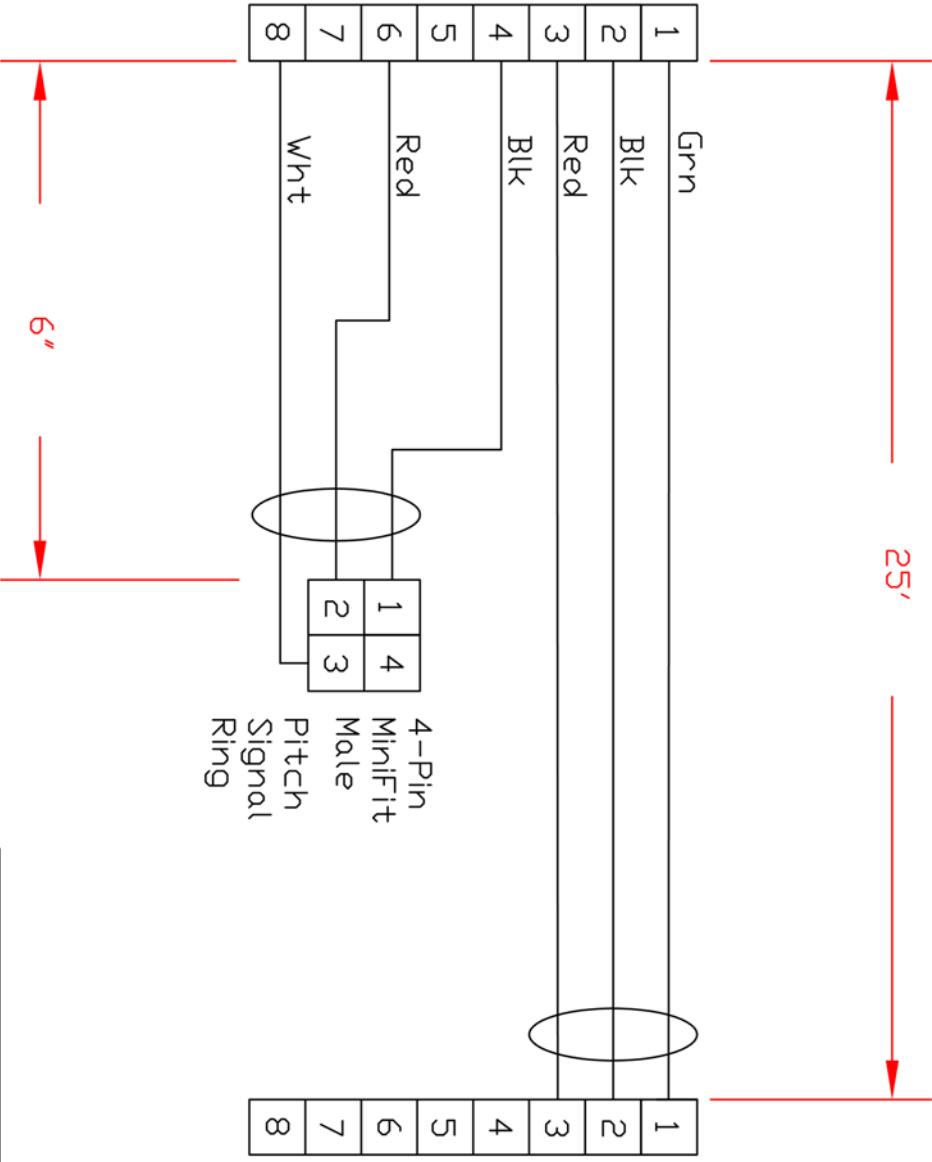
MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

Title RINGS ADAPTERS

Document Number

Size	DRAWN BY:	APPROVED BY:	Rev
A	Checked BY:		1
DATE	03-11-2011	Sheet	1 of 1

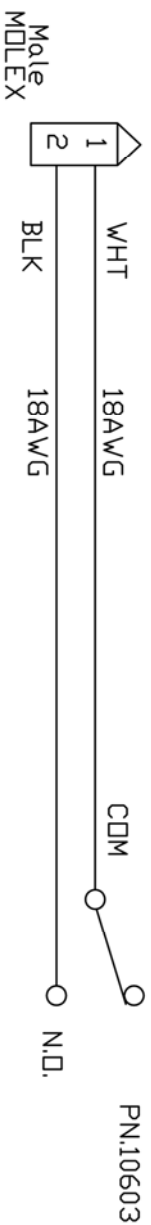
8-Pin Molex
Female
Motion
Control
Board



8-Pin Molex
Female

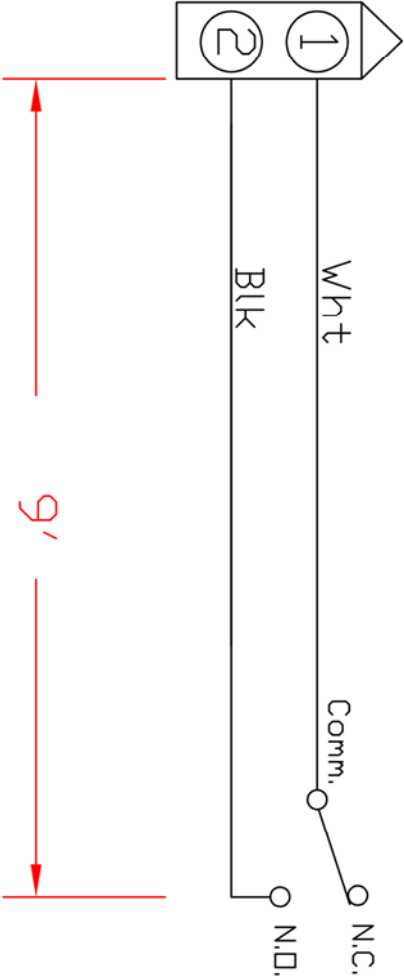
Power Box

MaxFlight Co. Executive Dr. Toms River NJ 08755	
Title Relay Signal Cable	
DOCUMENT NUMBER SE11139	
Size	Rev
DRAWN BY: DJH	CHECKED BY:
APPROVED BY:	Date: 03-31-2011
Sheet	of

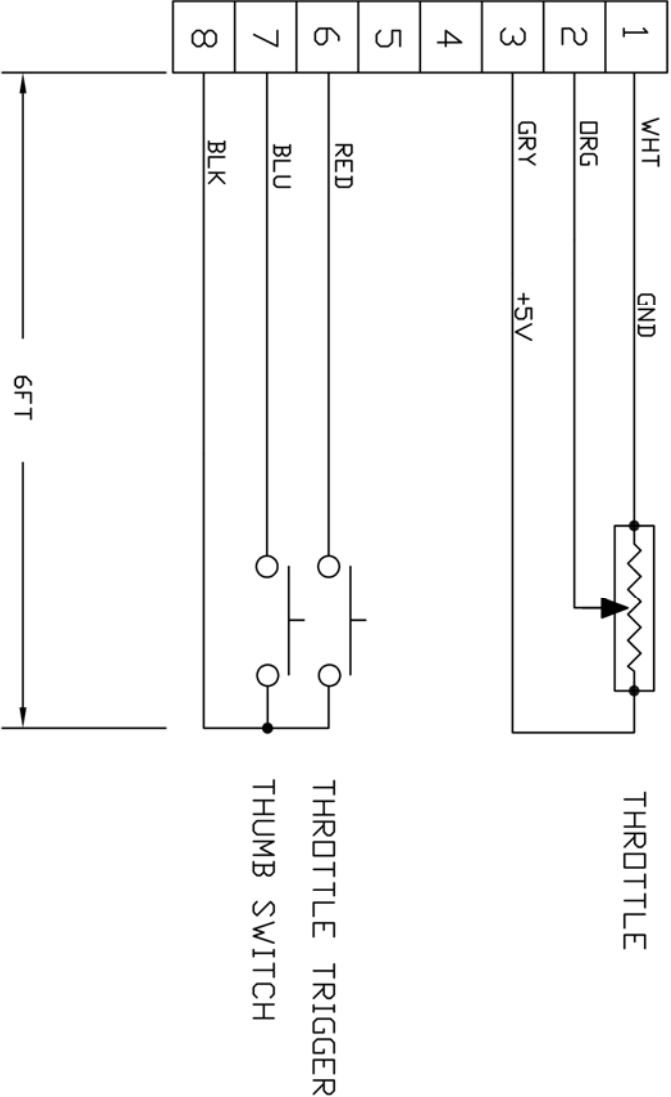
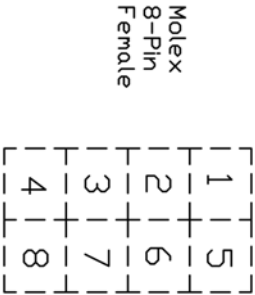


MAXFLIGHT CORPORATION 1 EXECUTIVE DR. TOMS RIVER NJ 08755			
TITLE UP-Right Sensor			
DOCUMENT NUMBER SE11-017R			
SIZE	DRAWN BY:	REV	
A	CHECKED BY:	APPROVED BY:	
DATE	04-06-2010	SHEET 1 OF 1	

Male



<div>MaxFlight Co. 1 Executive Dr. Toms River NJ 08755</div>				
TITLE UP-Left Sensor				
DOCUMENT NUMBER SEH1017L				
SIZE	DRAWN BY:		REV	
A	CHECKED BY:		APPROVED BY:	
DATE	06/09/2000		SHEET 1 OF 1	



Cockpit x2

MaxFlight Co. 1 Executive Dr. Toms River NJ 08755			
TITLE		Stand-Up Throttle Control Stick FS2000	
DOCUMENT NUMBER		SE20002	
SIZE	DRAWN BY:	DDH	REV
CHECKED BY:	APPROVED BY:		
DATE	05-25-2010		

Molex 8-Pin
Female

1
2
3
4
5
6
7
8

Blk

Red

Blu

Brn

Grn

Wht

Shld

20'

Cable 22AWG Shield

Molex 8-Pin
Male

1
2
3
4
5
6
7
8

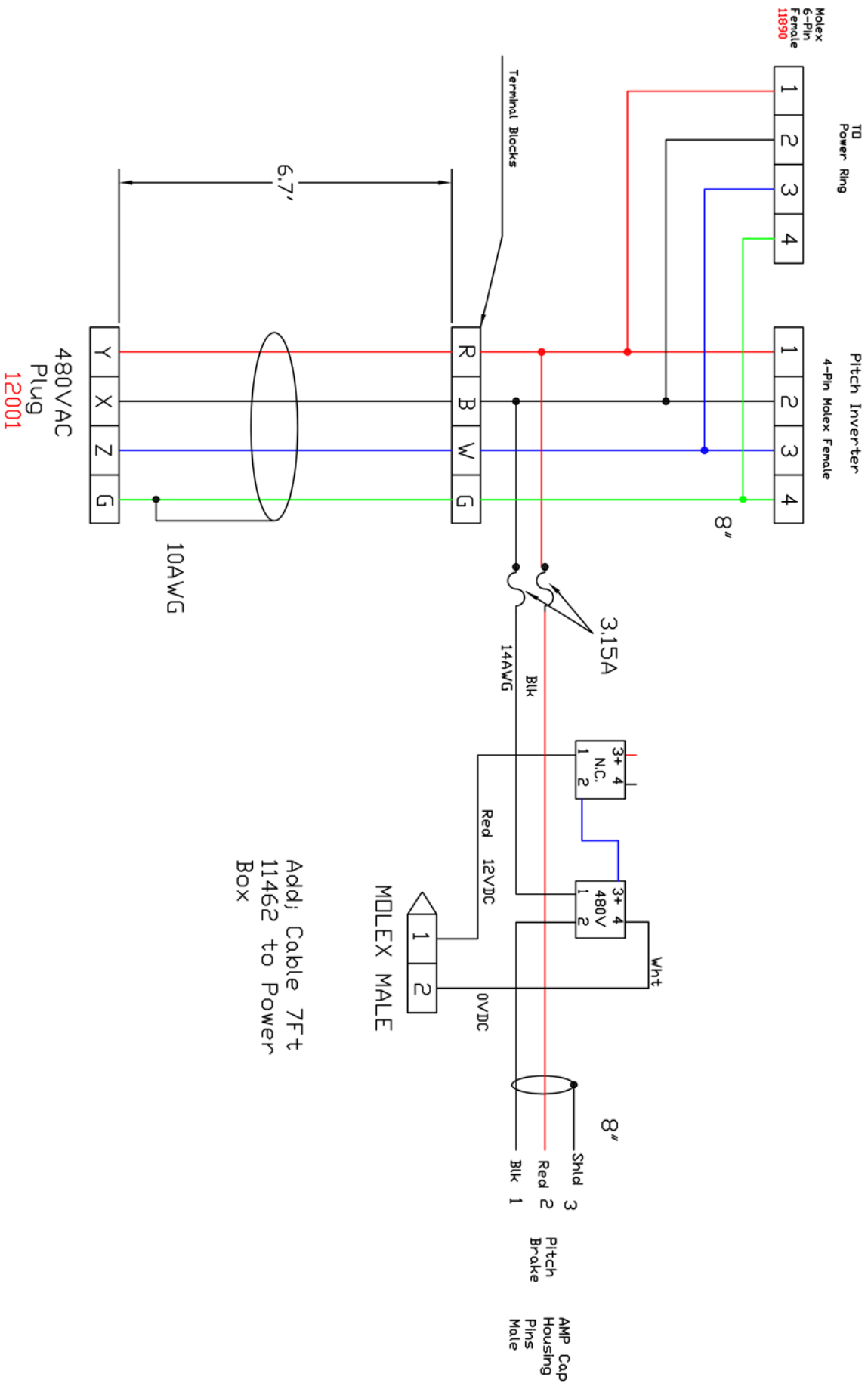
MaxFlight Co.
1 Executive Dr.
Toms River NJ 08755

Title Pitch Encoder Extention Cable

DOCUMENT NUMBER SE11149

Size	Drawn By:	Checked By:	Approved By:	Rev
A	DH			

Date:	10-25-2010	Sheet	1	of	1
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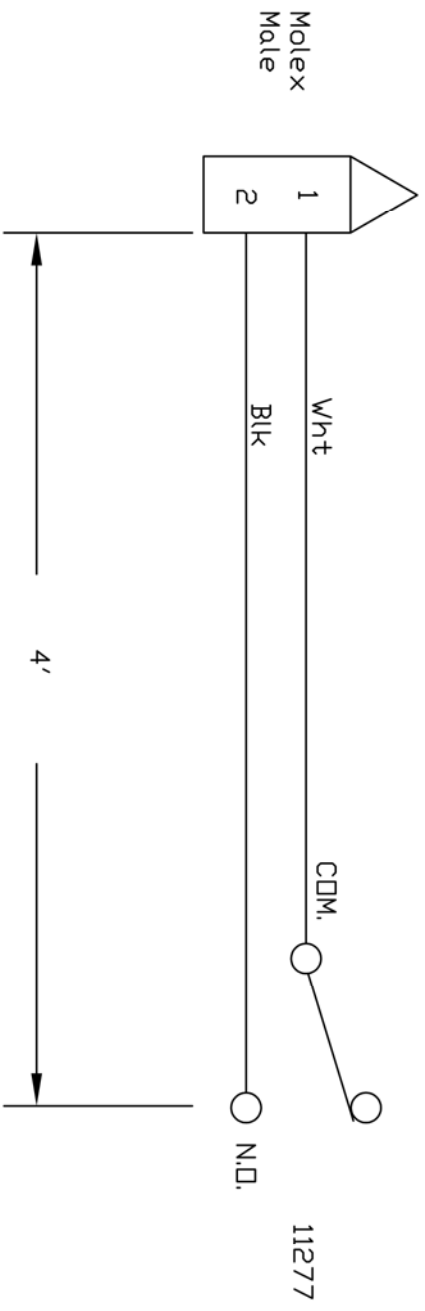
Title **PITCH MOTOR ELECTRICAL PANEL**

Document Number SE11147-2

Size **D3H** Rev

A CHECKED BY: APPROVED BY:

DATE 08-19-2010 Sheet 1 of 1

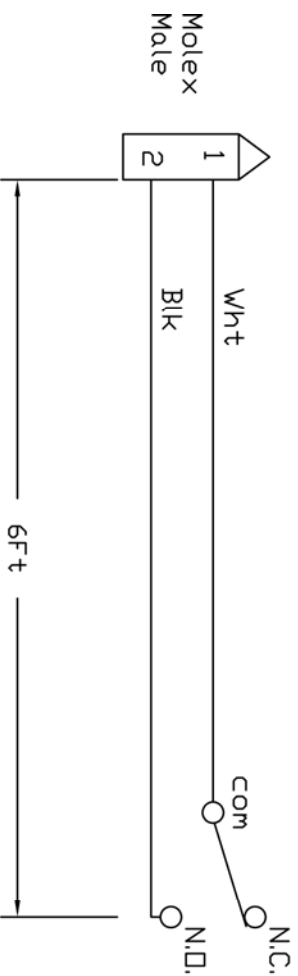
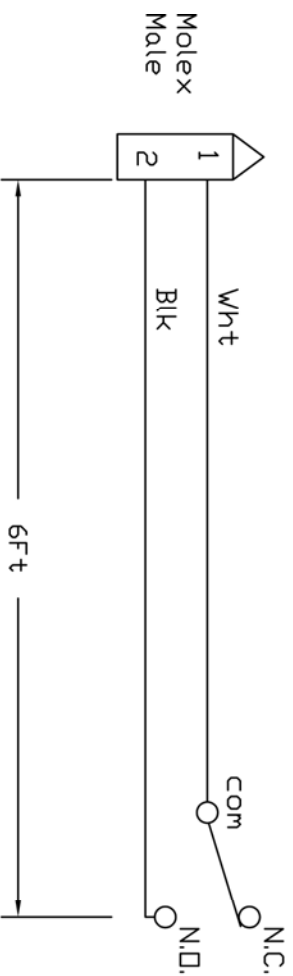


MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

TITLE Brake Release Switch & Cable

DOCUMENT NUMBER SE11141

SIZE		REV	
A	DRAWN BY:		
	CHECKED BY:		
DATE		APPROVED BY:	
SHEET 1 OF 1			



MaxFlight Co.
1 Executive Dr.
Toms River NJ 08755

Title Crotch Belt Switch & Cable

Document Number SE11111

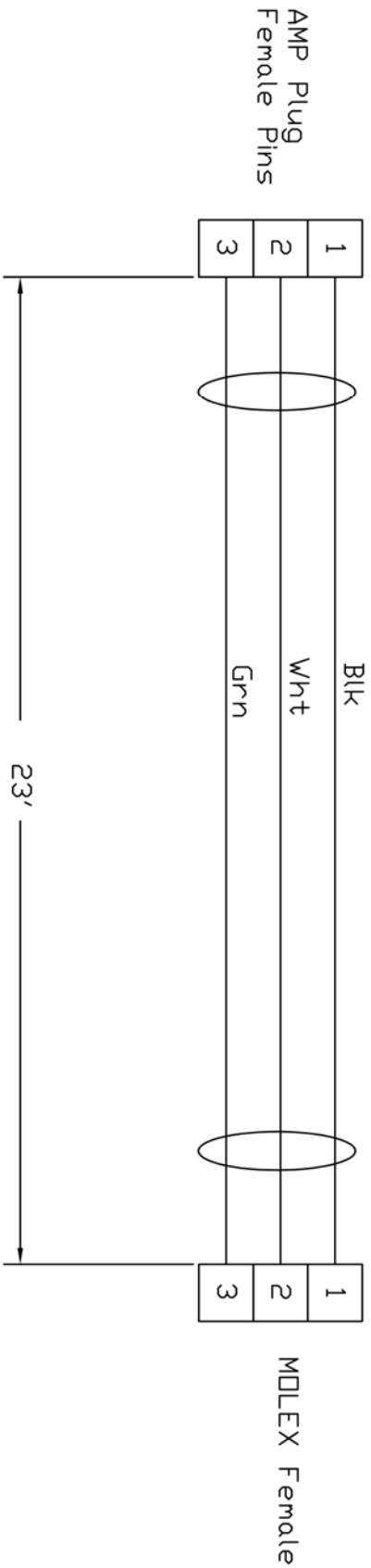
Size DRAWN BY: DJF

A CHECKED BY:

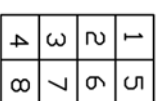
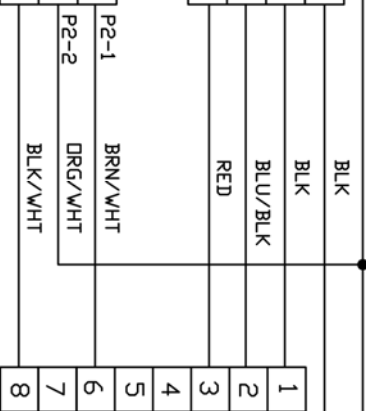
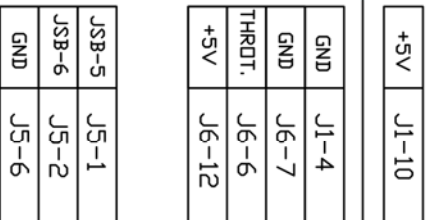
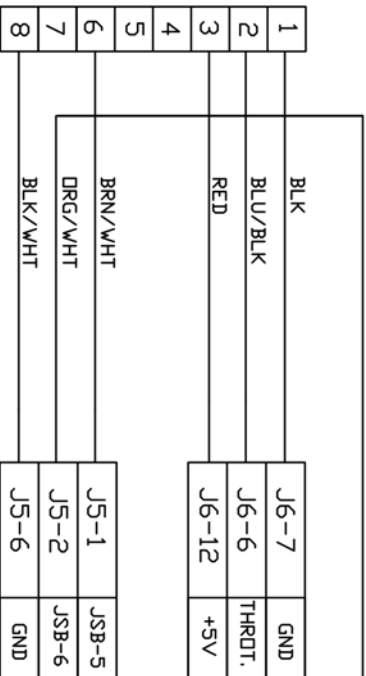
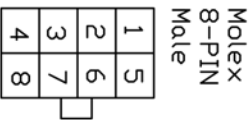
DATE

Rev 1

Sheet 1 of 1

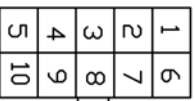
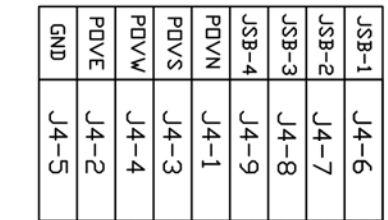
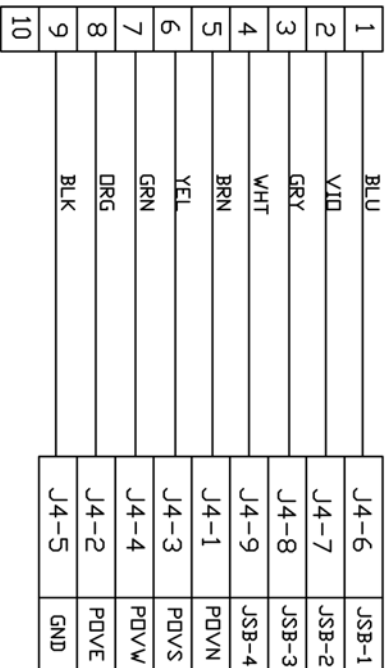
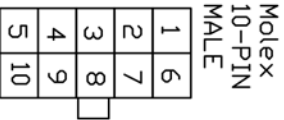


MaxFlight Co.			
I Executive Dr.			
Toms River NJ 08755			
Title			
E-STOP CABLE			
Document Number			
SE11108-1			
Size	DRAWN BY:		Rev
A	DJI		
CHECKED BY:	APPROVED BY:		
DATE	10-25-2010		Sheet 1 of 1

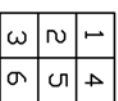
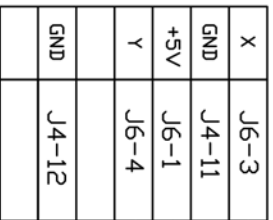
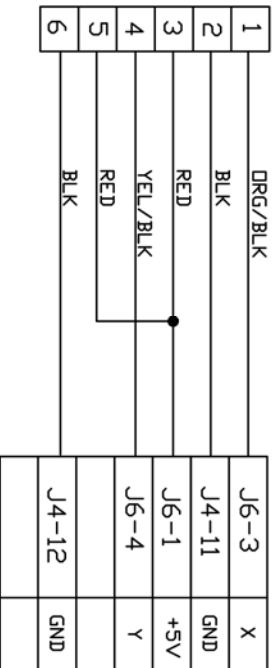
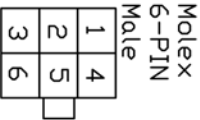


THROTTLE

SWITCH
Molex
3-PIN
Male



JOYSTICK



BOARD#1

BOARD#2

MaxFlight Co.	
I Executive Dr.	
Toms River NJ 08755	
TITLE USB Hopp Control for Cockpit	
SE11080-1	
DRAWN BY: DJH	APPROVED BY:
CHECKED BY:	
DATE	

USB HAP

GND	J6-7
THRDT.	J6-6
+5V	J6-12

BLK
BLU/BLK
RED

1
2
3
4
5

Molex
8-PIN
Male

Throttle

1	5
2	6
3	7
4	8

JSB-5	J5-1
JSB-6	J5-2
GND	J5-6

BRN/WH
ORG/WH
BLK/WH

6
7
8

JSB-1	J4-6
JSB-2	J4-7
JSB-3	J4-8
JSB-4	J4-9
POVN	J4-1
POVS	J4-3
POVW	J4-4
POVE	J4-2
GND	J4-5

BLU
VID
GRY
WHT
BRN
YEL
GRN
ORG
BLK

1
2
3
4
5
6
7
8
9
10

1	6
2	7
3	8
4	9
5	10

Joystick

X	J6-3
GND	J4-11
+5V	J6-1
Y	J6-4
Rudder	J6-5
GND	J4-12
GND	J6-8

ORG/BLK
BLK
RED
YEL/BLK
RED
BLK

1
2
3
4
5
6

1	4
2	5
3	6

Molex
6-PIN
Male

MaxFlight Co.
I Executive Dr.
Toms River NJ 08735

USB Hap Control for Stand-Up

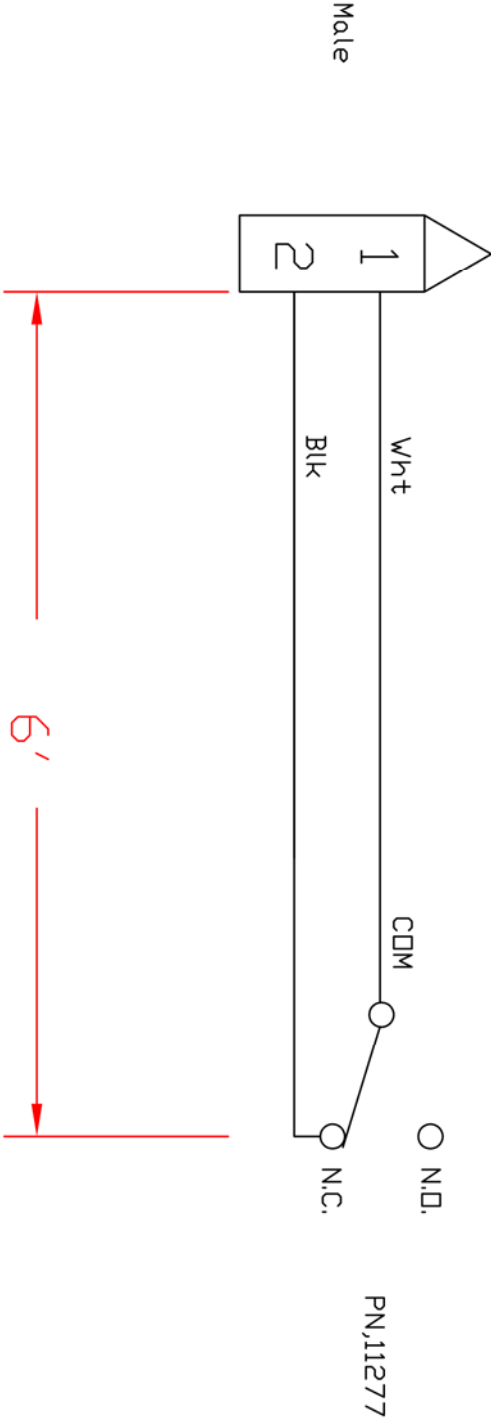
SE11079

DRAWN BY: JGF

CHECKED BY:

DATE 05/23/03

APPROVED BY:



MaxFlight Co.
I Executive Dr.
Toms River NJ 08755

TITLE Canopy Open Safety Switch

DOCUMENT NUMBER SE11020

SIZE	DRAWN BY,	APPROVED BY,	REV
A	JDJ		
CHECKED BY,			

Pin#	Description	Pin#
	GND	36

Pin	Color	Signal
1	Blk	Whit
2	Red	Blk
3	Blu	Whit
4	Brn	Blk
5	Grn	Whit
6	Whit	Blk
7	Shld	Whit
8		Blk

1	Blk		GND	39	Wht	1	DOWN
2	Red		+5VDC	GND	Blk	2	
3	Blu	19			Wht	1	CANDPY
4	Brn	20		37	Blk	2	
5	Grr	21		GND			
6	Wht	22			Wht	1	UP-RIGHT
7	Shld		GND	88	Blk	2	
8				GND			

1	Red	17	Grn	92	1
2	Blk	18	Blk	93	2
3	Wht	34	Red +5V	103	3
4	Grn	35	Brn	91	4
5		67			5
6		68	Blu	42	6
7	Shld				7
8		GND		57	8

<p>+5V 7,25,57,75,101,103 GND 8,12,26,58,62,76,102,104,105,107</p>							
<p>MaxFlight Co. I Executive Dr. Toms River NJ 08755</p>							
<p>Title</p>							
<p>PMD IM1000</p>							
<p>Document Number</p>							
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Rev							