

## **Machine Initialization in the Buildup Area**

1. When it seems that the machine is ready for the initial power up of the computer and inverters the following steps must be followed;
  - a. Ensure all connections are properly made and cables routed to clear any obstacles especially those cable routed to the power and signal pitch slip rings.
  - b. Ensure that roll slip ring cables are dressed properly to allow free motion.
  - c. Ensure that the lift system- center drive couplings, locking collars, keys, gear box , motor mounting are correct and secure. Check all set screws that pertain to the lift system.
  - d. Connect the command console power strip/UPS to facility power. Turn power to UPS on and allow it to charge the first time for at least 10-20 minutes. This will prevent erroneous computer functions during initial power up.
  - e. Power up the pre-amp and power amp, lights on.
  - f. Select the proper audio input on front, usually CD selected.
  - g. Set volume control to ½ way mark.
  - h. Set volume on power amp to full both knobs.
  - i. Power up the computer and monitor and allow system to come up to desktop.
  - j. The first time you start the computer perform a defrag on the disk drive/s before you initialize other programs.
  - k. Ensure that the main power connector to the power box is installed and connected to facility power.
  - l. Enable pull out the E-Stop on side of the command console, the inverters will now power up and fan in power box will run. If not correct before continuing.

### **Initializing, setting parameters and performing Auto-Tuning of Inverters.**

The inverters must be initialized, parameters set and auto-tune performed prior to moving or commanding motion on the platform. This is accomplished using the following procedures;

- a. Ensure power is ON to the inverters. Check that each inverter has the power on light on.
- b. Open the **VFD Setup** program by Double-clicking on the icon at desktop level or going into programs and selecting it.
- c. Click on **OFF-LINE** top center it will change from blue to red legend **ON-LINE**.
- d. Click on **System Read** bottom center, window will open and the computer will interrogate all of the inverters for their parameter settings and bring them into the program. This may take several minutes to do.
- e. Normally the next window will list all of the inverters by part number and their node location. Verify t these are correct by reading the inverter

legend tags attached to each inverter. **NOTE! You must also verify as to what this particular machine is wired for ie: 208 or higher voltage.**

- a. **For DOMESTIC MACHINES, 208 VAC three phase use PN FR-A520 for Nodes 0, 1, 2 and FR-E520 fro Node 3.**
- b. **For FOREIGN MACHINES, 220, 240, 380, 415, 477 VAC three phase use PN's FR- A540 for Nodes 0,1,2 and FR-E520 for Node 3.**
- f. When verified of correct part numbers click OK and the settings will be listed on the first page of the VFD setup screen.
- g. Select **Parameters** top row then select **List all Parameters.**
- h. System will perform the page listing and a new window will open showing all the values for each Node.
- i. Locate the disk labeled **Maxflight Manuals** and insert it in CD-Rom drive.
- j. Click on **Copy** bottom center, this will open a window allowing you to select where the reference **.MEL** is located. For first time power up perform these steps;
  - a. Locate the CD-Rom legend
  - b. Click on Manuals
  - c. Find File **Inverter Settings** and click on it
  - d. To the right select the proper **.MEL** by clicking on and highlighting either **Standard.MEL for domestic or low power inverters or Foreign.MEL for high voltage units.**
  - e. This opens a window where you have to select which **NODE** you are working with. Select or match the node number on the right with the node displayed on the top row ie; Top row states **00** you must select **0** in the window, click OK. This will load the reference values in the appropriate Node page on the right side.
  - f. Compare the reference values to the values directly to the left of them.
  - g. Click **Block Write** bottom line, this will copy reference values into the respective inverter.
  - h. Repeat steps a. to g. for the rest of the Nodes **00, 01,02,03.**
  - i. Now select Node **00** on top
  - j. Go to parameter #9 and insert the **Current** value that the motor will use by comparing the Voltage the motor is wired for to the current it will draw for the voltage selected. This is on the motor ID plate.
  - k. Insert value in para #9, by clicking on and highlighting the line and typing in the value on extreme right side, when correct, click on **Write** bottom, this will write the value into the computer.
  - l. Go to parameter # 96 and insert the value of ( **1** ) the same way you inserted value in #9. Click **Write** when correct.
  - m. **NOTE! Node ( 3 ) only gets value inserted in parameter #9 of .07, no other parameters get changed.**

**NOTE! Values for parameter #9 are at the end of these procedures**

- n. Repeat steps i. To l. for remaining nodes **01,02,03**.
- o. The above procedure set up the system for you to perform the next procedure called **Auto=Tuning** of the inverters.

**Auto-Tuning the Inverters prior to using them to control motion**

Nodes **00,01,02** must be Auto=Tuned before you can use them to control motion of the platform.

**NOTE! Node ( 03 ) does NOT get auto-tuned.**

This is the counterweight drive system. The current value is only inserted in parameter #9. Verify that the value of **0.7** is in #9.

- a. Select **Test Running** top line and then select **Auto-Tuning**.
- b. Select Node **00** top line.
- c. Click **Check** middle of window, another window appears stating/asking if everything is safe to run a test.

**Warning!!! Ensure that parameter value in #96 is (1) nothing else, if another value is there, change it to the value of ( 1 ).**

- d. Click **OK** and then click on either **FWD** or **REV** icon, the test begins and green legends will appear directly above indicating that the system is performing an Auto-Test on that axis.
- e. When completed successfully it will state **Fin** click **OK**
- f. Repeat steps b. to e. for Node **01, and 02**.
- g. When Auto-Tuning has been completed successfully, close auto-tune window and go back into **All List Format** of parameters.
- h. Select node **00** click on line parameter #9 and write in the value of **0.0** and click **Write**. This will change the value to the left to all 0's.
- i. Repeat step h. for nodes **01 and 02**.
- j. When done click **File** select **Save As**
- k. Save the parameter settings on local drive "**C**" **INVISUPE**. Type in the word **Std( machine#).Mel**. Sample you are working on machine EM-31 the typed message should read as follows , **StdEM31.Mel** then click **Save**.
- l. Press in **E-Stop** button on side of command console and then back to **ON**. This ensures that the values were recorded and saved to the inverters and the hard drive. Close out the VFD Setup program and go back to desktop.

**Verifying correct Motor Rotation and Direction.**

Before running a motion program you must verify that the inverters are controlling the motor rotation correctly. Should someone have wired the connectors or motor power leads incorrectly, rotation may be backwards than required.

- a. Open **Mitsubishi Inverter Test** program

**Warning!!! Verify that the area is clear of equipment and personnel prior to putting platform into motion.**

- b. Insert all the axis inverters by clicking on **Add Inverters**, make the correct choices to load control column.
- c. Again check to ensure area is clear for motion. **NOTE! Raise the platform only to halfway point STOP and check for any cable or mechanical interference. Have persons monitor each side as you raise to the full up position.**
- d. Selecting the **C/W** axes, click on **Increase** the weight must go rearward and stop with the clutch free wheeling. Click **STOP** and align the C/W jackscrew and guide rail, tighten bolts.
- e. Click on **Decrease** and weight must come forward to stop and clutch free wheel at the end. **Should movement be reversed, change any two output leads on the C/W Inverter output side. Retest.**
- f. Balance the platform by moving weight to rear until neutral balance has been obtained. Check by moving cockpit up and down between two fingers, it should move freely.
- g. Selecting the **Lift** axes, click on **Raise** the machine must start raising if it does not click **STOP. Change any two power leads to motor connector at the power box end.** Raise half way, stop, check for interference and continue raising to the top. When at the top the current value will increase rapidly for lift axes you must click **STOP** immediately.

**WARNING!!! The platform must be all the way to the top prior to conducting the following test procedures. Equipment damage will result if not so.**

- h. Select the **Roll** axes and click **Right**, the front of the cockpit must rotate to the right. Click **STOP** then click **Left** and platform must rotate left. **If it does not, you must change two of the power leads inside the motor connector that connects to the power box.**
- i. Select the **Pitch** axes and click **Up** the platform must go towards the ceiling. Click **STOP** and then **Down** and the platform must rotate towards the floor. **If it does not, change any two power leads inside motor feed connector at the power box end.**
- j. Level the platform in **Pitch and Roll**. Using the manual brake release knob on back of the lift motor, slowly turn knob clockwise until platform starts lowering, continue lowering until all the way back down on the stands. Release knob back to horizontal OFF position.
- k. Close out the Test Program by clicking on “X”.

### **Verifying Sensors, switches and encoders.**

After you have correct rotation in all axes you must ensure that all the platform sensors UP- right and left, Down sensor, patron E-Stop, Canopy Open Sensor are performing correctly. This is accomplished in the following program.

- a. D-click on **Mitsubishi Client Test** this opens a program where all the safeties and motion control command program is tested. This is the same program that all the coaster, flight sim etc programs use to move the platform.
- b. Open the windows fully

- c. Ensure that the **Down Sensor** is checked only, **NOTE! If canopy is open the canopy open sensor may be checked also, close the canopy.**if not adjust the sensor switch arm accordingly until it registers correctly.
- d. Manually have someone push up on each **Up Sensor** to test wiring.
- e. Manually press in the cockpit **E-Stop** to see if it registers.
- f. Manually press on the canopy open sensor and see if it changes.
- g. Close canopy, canopy sensor must be unchecked, if not, adjust switch arm accordingly.
- h. Ensure **E-Stop** on side of console is pulled out. The cockpit canopy be must be closed and latched for the next tests.
- i. Ensure that the Bird or Merlin is gone and no faults show on desktop.
- j. Click on raise, machine goes up three inches, stops, and counterbalances there. Once balanced will go all the way to the top and stop automatically. Monitor the following;
  1. Encoder count in lift goes to value of ( **3.0** ) for balance point. Then changes to ( **29.75** ) for raise portion. If neither is correct make changes in **REGEDIT** and retest.
  2. Pitch Encoder should read either positive or negative depending on platform unbalance. Encoder should be near ZERO when unit is raising to the top.
- k. Click on **STOP** by the lift section
- l. Click **Start then Run** in the pitch/roll control section
- m. Click and hold pointer over either pitch or roll axes and move icon forward or back, up or down. The axes must follow the pointer smoothly.
- n. Click on “X” in lower corner, both axes must return to home zero position.  
**NOTE!! Should you experience runaway from either axes, yo must hit E-STOP immediately and correct the problem. Either encoder is not reading or power phasing is incorrect. Retest.**
- o. Click on **STOP in axes control.**
- p. Click on **Lower** under lift control, platform comes down, slows, then slows again and finally stops at stand level.
- q. Close the program. The platform is now capable of performing motion in any/all programs.
- r. Press **E-Stop** on side of console to remove inverter power.

### Normal Parameter #9 Settings

**Low/Med Voltage**----- 00= Pitch = 13.1 , 01= Roll = 8.6 , 02= Lift = 8.5 ,  
03= C/W = 0.7

**High Voltage**--- 00= Pitch = 6.5 , 01 = Roll =4.2 , 02 = Lift =4.3 ,  
03 = C/W = 0.7 ,