

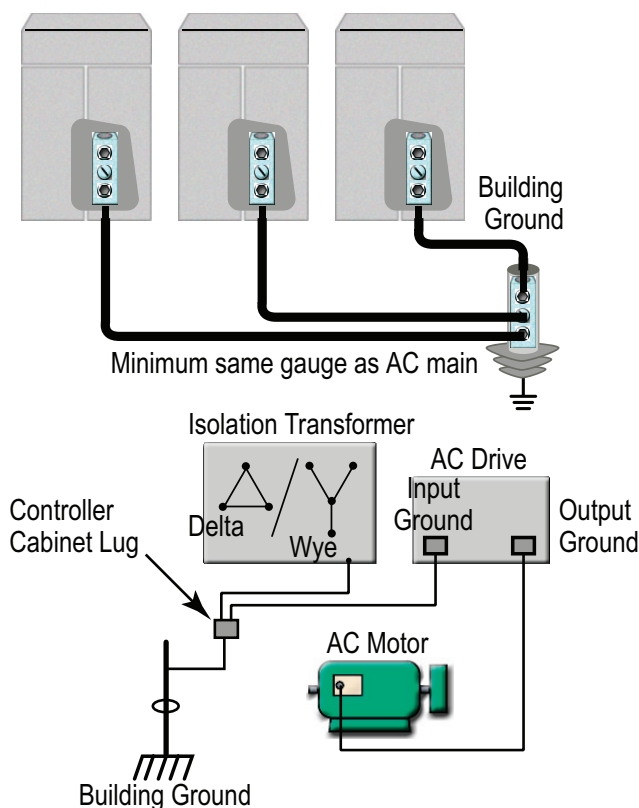
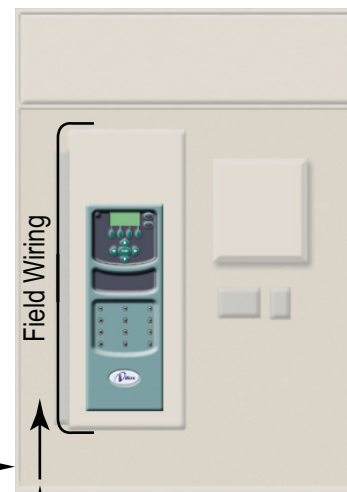
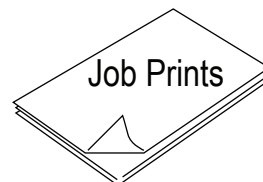
# ***iController AC***

## ***Installation Quick Reference***

This quick reference provides general instructions to help experienced personnel install an iControl AC elevator control. Please refer to Sections 2, 3, and 4 of the iControl AC User Guide (MCE # 42-02-2220) as necessary for complete instructions.

### **Cabinet, Motor, Brake, & Safety**

1. Study the job prints. They are always the controlling document.
2. Check the controller visually. Open the cabinet and the power box to make certain nothing has been damaged or dislodged during shipment.
3. Open cable access holes in the areas indicated by the stickers. Be careful that no metal filings get into electronics.
4. Ground all equipment according to job prints and local code.



5. If re-using the hoist motor, check insulation with a Megohm meter. 100k Ohms required.
6. Using the job prints, wire the hoist motor and velocity encoder. Never route power and control wires in the same conduit.
7. Set brake resistance RB for 3x the resistance measured across the brake coil.
8. Wire the brake as shown in the job prints.

## Critical Installation Safety Precautions

During installation, jumpers may be used to temporarily replace devices that you are not ready to install. You may also need to wire temporary switches to operate the car. When this is the case:

- **ALWAYS** connect an individual jumper for each (temporarily omitted) device so that, when the device is installed, that jumper is removed.
- **ALWAYS** connect temporary run buttons in the cartop inspection circuits so that they have top priority.
- **ALWAYS** insert a temporary emergency stop switch in the safety circuit between terminals SAFH and SAFC — NOT in series with the Enable/Safe button.
- **ALWAYS** get the Governor/Governor Switch and Safeties/Safety Operator Switch (plank) operational as soon as possible.

1. If the associated devices are not installed and jumpers need to be used:

- 3 Bus to GOV
- 3 Bus to ESC
- 3 Bus to DLAT
- 3 Bus to DLMS
- 3 Bus to DLMS-R if rear doors are present
- 3 Bus to DLAB
- 3 Bus to GS
- 3 Bus to UNTD
- 3 Bus to DNTD
- 2 Bus to ESS
- GOV to SAFH
- SAFH to SAFC
- ALWAYS REMOVE JUMPERS AS SOON AS PROPER WIRING IS POSSIBLE.

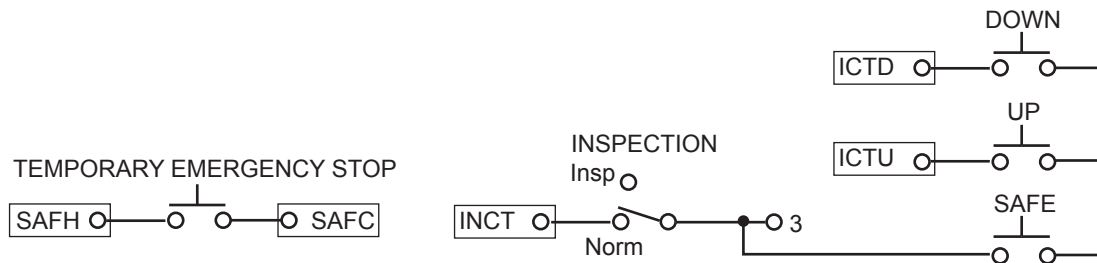
**NOTE:**

- 1 Bus: Common
- 2 Bus: 120 VAC
- 3 Bus: 110VDC

**Be sure you are making the connection to the correct bus to avoid equipment damage.**

2. If you will be running the car on Construction Mode without the cartop interconnect box, temporarily connect the cartop and hoistway safety switches, and the access locks and contacts as shown in the job prints. The safety string must be wired in series between the iBox SAFH and SAFC terminals. (If you are installing the iLink cartop box and/or the iLand landing system now, refer to iController User Guide Section 3 and the job prints for instructions.)

3. If needed, connect temporary cartop inspection switches as shown.



4. Bypass the rope gripper (if called for) using a jumper between RG5 and RG7.
5. Disengage the fuses at the top and bottom of the iBox. Open the power box and disengage fuses on the fuse board. Using an ohmmeter, check for shorts between field connections (DZ down to SP4) and the #1 (common) bus. Also check the #2 (120VAC) bus, the #3 (110VDC) bus, motor power terminals L1, L2, and L3, and brake terminals B1 and B2 for shorts to ground/#1 bus. Restore all fuses.
6. Verify AC power is as shown in the job prints. Set the iBox Inspection switch to INSP, the Controller Stop switch to STOP, and the Test switch to ON. Connect AC power to the iController according to local codes.



**DANGER!**

Extremely high voltages and moving machinery can cause serious injury or death. Take precautions to avoid electric shock and make certain driven machinery will not move unexpectedly.

7. Check controller buses for proper voltages.

## Verifying Parameters

Operating parameters are preset at the factory according to the job survey. Regardless, you must verify that the settings are correct for the job using the iView application.

### Using iView

1. Connect the PC to iBox Port #3 (PC Direct) with a standard Ethernet cable. The #3 port IP address is 192.168.193.001 (subnet mask 255.255.255.0, gateway 0.0.0.0).
2. Start the PC and double-click the iView icon to launch the application.
3. Click the Direct Connect icon for the car. This should open a Controller window with menus across the top.
4. Select Connect from the Connections menu. A row of buttons will appear. These buttons are used to open iView screens. (Poise the mouse cursor over a button and an identifying label will appear.)

If you have trouble connecting to the controller using iView, please refer to the connecting information in Section 2 of the User Guide. You may have to change the IP address of the PC if it is not already correctly set.

Check the following and set if necessary. (To send changes to the iBox, you will need to select *Acquire* from the *Privileges* menu and OK the request manually on the iBox.)

**Table 1.1 Recommended iView Starting Values for Initial Operation**

iView Screen Settings						
Pattern Configuration – Common						
<b>Pos Endcr Resolution</b>	256					
<b>Job Contract Speed</b>	<b>200 fpm</b>	<b>350 fpm</b>	<b>400 fpm</b>	<b>500 fpm</b>	<b>600 + fpm</b>	<b>Unit</b>
Leveling Speed	005	005	005	005	005	fpm
Releveling Speed	008	008	008	008	008	fpm
Leveling Distance	1.20	0.72	0.60	0.60	0.60	inches
Pattern Scale	100%	100%	100%	100%	100%	%
Dead Zone Distance	0.25	0.25	0.25	0.25	0.25	inches
Re-level Dead Zone Dis.	0.15	0.15	0.15	0.15	0.15	inches
Relevel Distance	0.60	0.60	0.60	0.60	0.60	inches
Door Pre-Opening Dis.	0.00	0.00	0.00	0.00	0.00	inches
Pattern Configuration – Standard						
<b>Job Contract Speed</b>	<b>200 fpm</b>	<b>350 fpm</b>	<b>400 fpm</b>	<b>500 fpm</b>	<b>600 + fpm</b>	<b>Unit</b>
Initial Jerk	6.00	6.00	5.00	5.00	6.0	ft/s <sup>3</sup>
Acceleration	2.40	3.20	3.40	3.60	3.80	ft/s <sup>2</sup>
High Roll Jerk	6.00	6.00	5.00	5.00	4.00	ft/s <sup>3</sup>
High Speed	200	350	400	500	600	ft/min
Low Roll Jerk	6.00	6.00	5.00	5.00	4.00	ft/s <sup>3</sup>
Deceleration	2.20	2.90	3.20	3.30	3.50	ft/s <sup>2</sup>
Flare Jerk	3.00	3.00	3.00	3.00	3.00	ft/s <sup>3</sup>
Approach Deceleration	1.50	1.50	1.50	1.50	1.50	ft/s <sup>2</sup>
Approach Jerk	2.00	2.00	2.00	2.00	2.00	ft/s <sup>3</sup>

**Table 1.1 Recommended iView Starting Values for Initial Operation**

<b>iView Screen Settings</b>						
<b>Pattern Configuration – Inspection</b>						
<b>Job Contract Speed</b>	<b>200 fpm</b>	<b>350 fpm</b>	<b>400 fpm</b>	<b>500 fpm</b>	<b>600 + fpm</b>	<b>Unit</b>
Initial Jerk	6.00	6.00	5.00	5.00	6.0	ft/s <sup>3</sup>
Acceleration	2.40	3.20	3.40	3.60	3.80	ft/s <sup>2</sup>
High Roll Jerk	6.00	6.00	5.00	5.00	4.00	ft/s <sup>3</sup>
High Speed	30	30	30	30	30	ft/min
Low Roll Jerk	6.00	6.00	5.00	5.00	4.00	ft/s <sup>3</sup>
Deceleration	2.20	2.90	3.20	3.30	3.50	ft/s <sup>2</sup>
Flare Jerk	3.00	3.00	3.00	3.00	3.00	ft/s <sup>3</sup>
Approach Deceleration	1.50	1.50	1.50	1.50	1.50	ft/s <sup>2</sup>
Approach Jerk	2.00	2.00	2.00	2.00	2.00	ft/s <sup>3</sup>
Low Speed	10	10	10	10	10	ft/min
<b>Car Operation - Common</b>						
(Miscellaneous) Simplex	Set to Simplex, if the car is NOT in a group, to enable dispatch and parking functionality for a single car.					
<b>Drive Configuration – General</b>						
Drive Type	Factory set. Verify drive type selected is correct.					
Following Error	25%, default (Drive Configuration - Safety tab)					
Speed Reference Scale	1.000					
Speed Reference Resol	Velocity Encoder PPR					
Rated Motor RPM	From motor name plate					
Coupling Rotation Ratio	(Brake drum or Sheave Diameter/ Diameter of encoder wheel). If shaft mounted, set to 1.000					
Speed Reference	Encoder					
<b>Safety Configuration – General</b>						
Pulses Per Foot	Display Only					
Contract Speed	Display Only					
Contract Overspeed	107% of Contract Speed					
Inspection Overspeed	150 feet per minute					
Leveling Overspeed	150 feet per minute					
Limit One Margin	8%					
Top Access Landing	Job specific, check job prints					
Top Access Rear	Job specific, check job prints					
Bottom Access Landing	Job specific, check job prints					
Bottom Access Rear	Job specific, check job prints					
No Main String	Job specific, check job prints					
No Main String Rear	Job specific, check job prints					
Frnt Door Close Contact	Job specific, check job prints					
Rear Door Close Contact	Job specific, check job prints					
Rear Doors	Job specific, check job prints					
Freight Door Option 1	Job specific, check job prints					
Rope Gripper	Check to see if a rope gripper is used					
Car Top Exit	Check job prints.					
Construction Mode	Set to <b>ON</b> .					
Door Position Monitor	Check if used (see job prints)					
In Car Panel Inspection	Check if used (see job prints)					

5. Check the AC drive parameters against the MCE Quick Reference for the drive.

## Calibrate the Brake

1. Verify iBox Safety LED ON.
2. Set iBox Inspection switch to INSP.

### High Current Brake

1. Open the iView Brake screen. Verify Pick and Hold voltages as shown in your job prints.
2. Set Releveling and Weakening voltage the same as Pick voltage (for now).
3. For initial rollback control, set Pick Delay to 0.600 seconds and Speed Pick Delay to 0.700 seconds. Click Send to save the changes.
4. On the Brake screen, select the Calibration tab.
5. Set the iBox Learn switch to ON.
6. With the Ready indicator lighted, click on the Start Calibration button. Watch the display. It will report progress and display instructions you need to complete (if needed). The Waiting LED will light if the iBox is waiting for you to complete an instruction. (If needed after completing a manual instruction, click the Continue button.)
7. When iControl is ready to begin learning, the screen will display “Wait\_For\_Dir.” When it does, press and hold the iBox Enable and Up (or Down) buttons. (The car will not be moved during this procedure.)
8. When the Done indicator lights, release to Enable and Up (or Down) buttons. Set the Learn switch to OFF. Next, verify brake picking—
9. Open the Pattern screen, Common tab. Set Pattern Scaling to 0% and send the value to the controller.
10. Measure brake output voltage across B1 and B2 (just below the iBox).
11. Press and hold Enable and Up (or Down) on the iBox. The brake should lift but the car should not move because Pattern Scaling is set to 0%. Verify that the volt meter reads the same as the Command voltage and voltage feedback on the Brake screen.
12. Change Brake Pick and Hold voltages to one/half the current Pick Voltage and send the changed values to the controller.
13. Press and hold Enable and Up and again verify brake voltage. (The brake may not pick since we are outputting only half the voltage.)
14. Change Brake Pick and Hold voltages to their job print settings and save them.
15. Return Pattern Scaling to 100% and Send that value to the controller.

### Low Current Brake

1. Open the iView Brake screen.
2. Verify that brake Feedback voltage is as shown on the job prints.
3. Open the Pattern screen, Common tab. Set Pattern Scaling to 0% and send the value to the controller.
4. Measure brake output voltage across B1 and B2 (just below the iBox).
5. Press and hold Enable and Up (or Down) on the iBox. The brake should lift but the car should not move because Pattern Scaling is set to 0%. Verify that the volt meter reads the same as the voltage feedback on the iView Brake screen. Adjust RB1 if necessary.
6. Return Pattern Scaling to 100% and Send that value to the controller.

## Verify Brake Operation and Car Speed

1. Check that the brake is picking and dropping properly.
2. Use a hand-held tachometer to verify that the car is running at the set inspection speed.
3. Use the iView Oscilloscope screen to verify that Speed Feedback is following Pattern commanded.
4. If not, verify that Standard High Speed, Inspection High Speed, and actual car speed are correct. If so, adjust Coupling Rotational Ratio until the feedback trace follows the pattern trace.
5. On the Drive/Safety screen, set Following Error to 10%.

## Motor Overload Protection

If the car is running properly on inspection mode and drawing normal current:

1. Verify drive LF.08 is set to 3 (non-ventilated motor, drive fault E.OH2 without delay).
2. Write down the value of LF.09. Reduce LF.09 setting by 20%.
3. Run the car on inspection. After about 1 minute, the drive should trip an E.OH2 fault and shut down.
4. The fault will clear after 5 seconds. Set LF.09 back to its original setting (must be equal to LF.12, Motor FLA).

**Construction Mode: The car should now be running properly in construction mode (basic operation, installation not complete). To proceed to Inspection Operation (complete installation but final adjustments not made), continue with these instructions.**

## Landing System, iLink Cartop Box, Door Operator, and Calls

1. Refer to user guide Section 3. Install the iLand landing system and the iLink cartop box as instructed and as shown on the job prints.
2. Install and adjust the door operator using the manufacturer instructions and the job prints.
3. Wire the cartop inspection and safety switches as shown on the -CT drawing in the job prints. You will have to remove temporary wiring installed to run the car during construction.
4. Connect the Car Operating Panel as shown in the job prints.
5. Connect standard or serial hall calls as shown in the job prints.
6. Verify door operator is working properly.
7. Verify landing system magnets properly installed.

## Hoistway

1. Install the hoistway switches as shown on the job prints.
2. Install the load weigher.
3. Install the (optional) brake pick switch.
4. Install the (optional) earthquake sensor.

## Exit Construction Mode

1. Open iView. Connect to the control.
2. Select Acquire from the Privileges menu. (Manually accept on iBox.)
3. Open the iView Safety screen.
4. Click the Construction Mode checkbox (so that it is de-selected).
5. Click Send. (The control will generate a safety mismatch fault because you have changed safety settings from those stored by the control.)

## Learn Safety Configuration

Anytime you change a Safety Screen setting, you need to relearn the safety configuration on the job.

1. Verify the iBox is in Inspection mode (Inspection switch set to INSP).
2. Set the iBox Learn switch to ON.
3. When Safety screen indicates controller is ready to learn, click on the iView Learn button.
4. The control will verify that the safety configurations again match. Set the iBox Learn switch back to OFF.

## Inspection Operation Run Test

1. Verify iBox Computer, Safety A, Safety B, and Cartop status LEDs are lighted green.
2. Set iBox Inspection switch to the INSP position.
3. Set iBox Controller Stop switch to the RUN position. (Within 5 seconds, the Safety OK and Doors Locked LEDs should be on and the Fault LED should be off.)
4. Verify that Car Door Bypass and Hall Door Bypass iBox switches are set to OFF.
5. Verify car is in Machine Room Inspection on iBox and iView. (If in another inspection mode, turn that mode off. The INCT, INA, and INCP inputs on the left edge of the iBox should be high, 110VDC.)
6. Press and hold the iBox Enable button, then press the Up or Down button to run the car. Run the car away from the terminal landing.
7. On the iView Hoistway screen, verify car speed. Use TorqMax drive parameter LF22 to calibrate speed if required.)
8. Move the car up and check that Actual Position and Cartop Position increase. Move the car down and check that Actual Position and Cartop Position decrease.
9. On the Hoistway screen, display the Faults tab. If quadrature pulses are reversed, a Position Quadrature Reversed fault will appear after the car moves a few feet.
10. If indications are not correct, check iBox to iLink and iLink to iLand connections.

## Final Adjust Preparation

### Door Operator

The door operator must be working properly before final adjustment.

1. Verify door fuses properly installed.
2. Verify iBox Car Door Bypass and Hoistway Door Bypass switches OFF.
3. Check door equipment clutches, rollers, etc. properly adjusted to correct clearances.
4. Check controller prints to make sure any door operator diode installation instructions have been followed (especially for G.A.L. door operators).
5. Verify all hoistway and car doors closed and locked.
6. Run car through hoistway on inspection mode to make sure hoistway is clear.

### Run Testing

1. Verify landing system magnets are installed according to job prints and instructions.
2. On inspection mode, run the car to midpoint of hoistway.
3. Set iBox Test switch to ON.

The car should be on Inspection operation and running without oscillation. There may be substantial rollback when car first starts.

4. In the iBox Controller Setup/Brake parameters, or on the iView Oscilloscope screen, set Software Test Point 1 to Raw Pattern.
5. Use a digital voltmeter to check the pattern voltage on iBox Test Point 1 with respect to the Common terminal.
6. Verify that Pattern Scaling is at 100% and Inspection Pattern High Speed is at 10% of Contract Speed (iView Pattern/Common and Pattern/Inspection screens or iBox Controller Setup/Pattern Profile). Maximum value for Inspection High Speed is 150fpm. Verify that the Inspection Low Speed Option is enabled and that Inspection Low Speed is set to 25 fpm.
7. Run the car on Inspection and check Test Point 1 voltage. If 8.0VDC is equal to Contract Speed, then the reading at 10% should be 0.8VDC (+/- 5%).
8. Set Inspection High Speed to 50fpm.

9. Run car to bottom landing. Use test weights to load the car to 125% of full load to check the ability of the brake to hold this weight. **If the brake does not hold, the car may slide into the pit. Use extreme caution.**
10. On Inspection, run car up the hoistway sufficiently to allow a down direction run.
11. On Inspection, run the car down the hoistway. While the car is moving, set iBox Controller Stop switch to STOP to force brake to apply while the car is moving. If necessary, adjust the brake to hold the load.
12. Remove the weights from the car.

## Empty Car Tests

With test weights removed (empty car), the following steps allow you to adjust the response of the car to reduce empty car rollback while avoiding the oscillations that can occur if too much gain is adjusted into the system. For these tests, use a storage oscilloscope capable of a 1.0 centimeter per second sweep rate.

1. In the iBox Controller Setup/Brake parameters, or on the iView Oscilloscope screen, set Software Test Point 1 to Speed Feedback. Monitor Test Point 1 with respect to Common.  
The empty car will probably drift up due to the counterweight, even when an attempt is made to move it down. Perform the following:
  - Torqmax Drive: Verify the drive gain parameters:
    - LF.31 IM-Kp Speed (proportional gain) = 3000 to 4000
    - LF.32 IM-Ki Speed (integral gain) = 1000
    - LF.34 IM-Kp Current (proportional gain) = 1500
    - LF.35 IM-Ki Current (integral gain) = 500
2. Adjust Brake Pick Delay and Speed Pick Delay (iBox Controller Setup/Brake or iView Brake screen/Timers tab) to coordinate the application of the speed pattern with the picking of the brake to avoid movement of the car under the brake or rollback of the car. A DRO fault may occur if Brake Pick Delay is reduced to a value lower than 0.30. Generally, Brake Pick Delay is set to 0.40 and Speed Pick Delay is set to 0.50 or slightly higher. (For Torqmax drives, verify that LF.70 = 0.300 (Delay to turn on DRO).
3. Experiment with improving response. A little rollback at this point is not critical as later adjustments will compensate for it.
4. Verify that Pattern Scaling is 100%.
5. Verify that car speed is 10% of Contract High Speed on the iView Hoistway screen (Actual Speed) or using a hand held tachometer and matches the Inspection High Speed setting.
6. Place the car back on Inspection operation.



## Counterweight Balancing

On modernizations, the weight of the car is often changed but compensating adjustments to the counterweight are sometimes overlooked.

1. Place a balanced load (specified percentage of full load; typically 40%) in the car.
2. On Inspection mode, run the car to the middle of the hoistway.
3. Verify equal motor current in both UP and DOWN directions on the drive keypad display. Equal readings indicate that the counterweight is close to the correct value.
4. If necessary, take steps to achieve proper counterweighting. For a drum machine, follow the manufacturer counterweighting recommendations and test the drum machine limit switches.

At this point, the Fault/Function Bypass switch on the iBox should be in the OFF position. Fix all faults so that no fault is bypassed before proceeding. **If this is not possible, exercise EXTREME CAUTION while making final adjustments.**

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## Counterweight Learn Procedure

The procedure allows the controller to learn the hoistway position at which the car and counterweight are at the same height.

1. Move the car until the car and the counterweight are at the same height in the hoistway.
2. Place the iBox Inspection switch in the INSP position.
3. Place the iBox Learn switch in the ON position.
4. Open the iView Counterweight configuration screen. The Ready indicator should be lighted. If Ready is not lighted, follow the instructions in the message window until Ready is lighted.
5. With Ready lighted, click the Learn button.

The controller will learn the car/counterweight position and the Done indicator will light. The learned height of the counterweight is displayed on the iView Counterweight screen.

6. Set the Learn switch to OFF and the Inspection switch to NORM.

## Final Adjustment

Follow instructions in Section 4 of the iControl AC User Guide.