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Inteli-Lift

CPLD Relay Logic

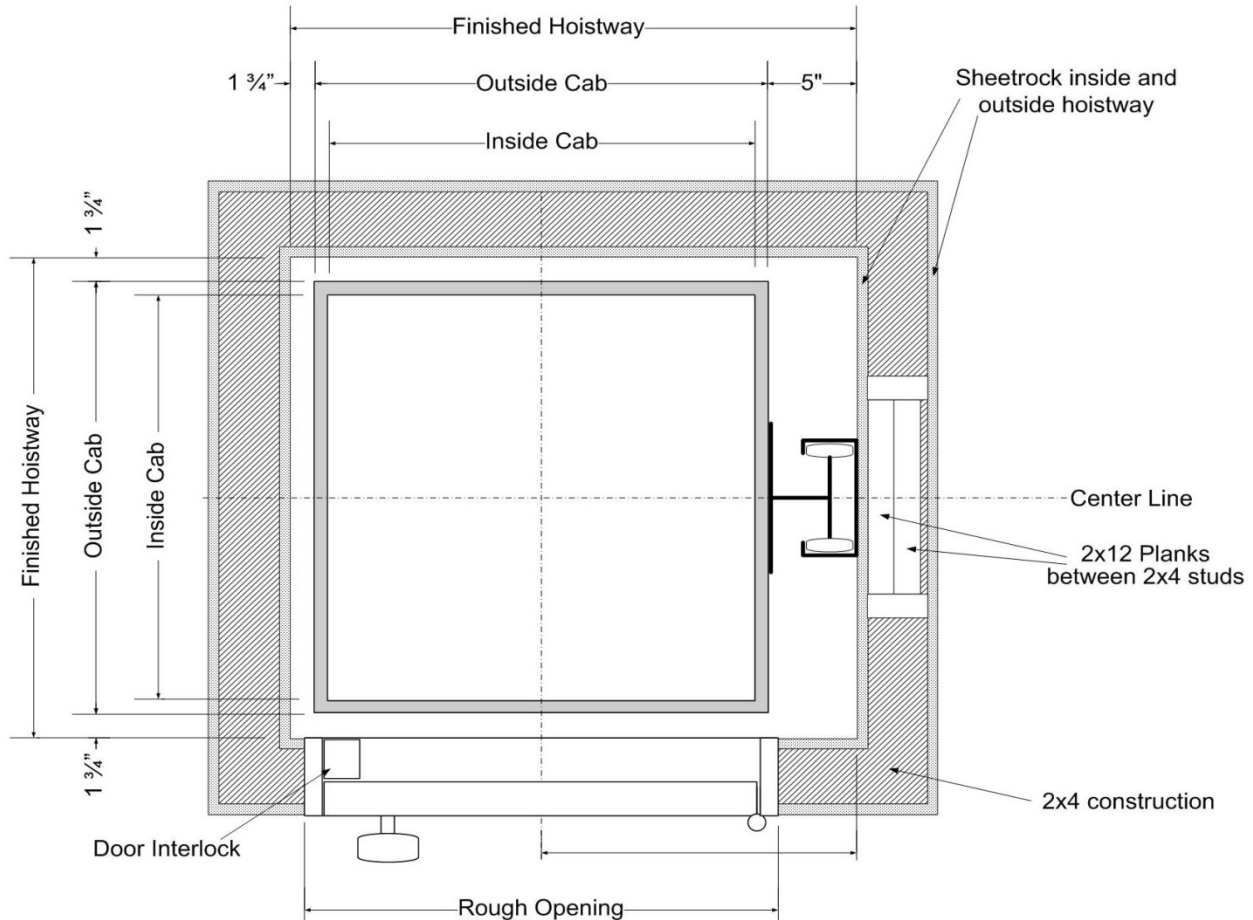
DUMBWAITER

Installation Manual

# Installation Manual

**This manual will cover the installation procedure step-by-step.** The installation of this dumbwaiter is easiest if the hoist-way is properly prepared. Pay close attention to hoist-way drawings and the following notes.

1. Build hoist-way to exact dimensions as instructed in the provided drawings. The dimensions indicated in drawings are **FINISHED DIMENSIONS**, **after sheetrock** has been installed
2. Insure that hoist-way walls are built plumb and square.
3. The reinforced rail wall must be built with 2 sets of 2x12 planks as shown in the drawings – the motor assembly, rail, cab, and load are all supported by this reinforced wall.
4. The entire inside of the hoist-way must have sheetrock installed prior to starting the installation
5. It is recommended to leave the front wall off the outside of hoist-way wall until installation is complete – this makes installation easier and is **REQUIRED** for commercial door installation after the DW is installed.
6. Installation of the motor assembly is much easier if one wall on bottom level is left unfinished – once the rail and motor assembly are mounted, DW is installed and doors positioned this wall can be finished.
7. A machine access door should be installed on the lower level for access to the motor assembly and the controller – **THIS DOOR MUST HAVE A LOCK AND REMAIN LOCKED AT ALL TIMES.**
8. For safety during installation, the installer should install a temporary floor across the hoist-way at each of the upper levels. This will prevent people from falling down the dumbwaiter shaft during installation.



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**FOR YOUR SAFETY: INSTALL A TEMPORARY FLOOR ACROSS THE HOISTWAY AT EACH OF THE UPPER LEVELS.** This will make installation of the rail easier, and prevent anyone from falling down the dumbwaiter shaft. Leave 6" of space from the reinforced wall for the rail to slide past the temporary floor.

Mark a center line down the load bearing wall. This can be done with a chalk line, or a straight edge.

Draw a mark 6" below the door opening along the center line. This will designate the bottom edge of the rail.



**Start the 1st rail on the wall with the bottom edge at least 6" below the bottom floor door opening. The center line on the wall should be visible down the center of each hole in the rail.**

Mark the location of the bottom and top holes in the rail and drill pilot holes using a 1/4" drill bit.

Insert roll pins in the slots at the top of the 1<sup>st</sup> piece of rail. Leave 1/4" of roll pins protruding from the top of the rail (see image on top of next page).



Mount the rail on the wall using lag bolts provided (1/2" x 3 1/2").

**IMPORTANT:** Do not use washers with the lag bolts.

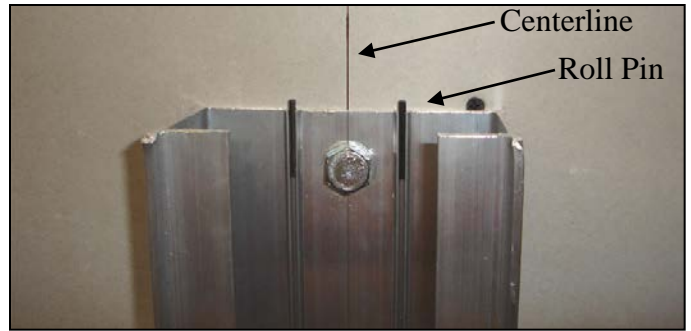
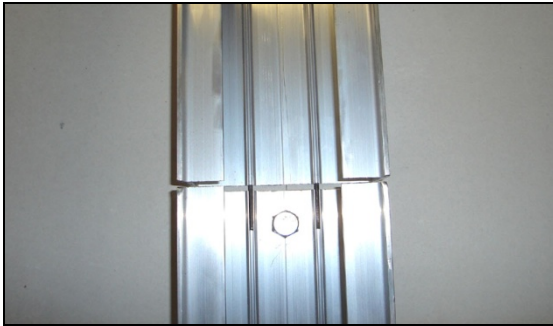
**CAUTION: Do not over tighten the lag bolts as this will bend the rail in and cause problems with trolley movement in the downward direction.**

Confirm that the center line is running down the center of the rail. Drill pilot holes and install lag bolts in remaining holes in the rail.

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1<sup>st</sup> rail should be mounted such that the centerline on the wall lines up with the centerline of the rail.

The roll pins should be protruding ¼” out of the rail.



Place the 2<sup>nd</sup> piece of rail in position above the 1<sup>st</sup>. The roll pins should slide in the slots on the 2<sup>nd</sup> rail.

Use a block of wood to tap down on the rail, insuring that there is no space between the rails.



Drill pilot holes and secure the 2<sup>nd</sup> rail in place using lag bolts provided.

**CAUTION:** Do not over tighten the lag bolts as this will bend the rail and cause problems.

Repeat this process with remaining rails, taking care to keep rails lined up with the centerline.



If included the stabilizer bracket must be installed before the trolley – See appendix A near the end of this manual.

Install the trolley from the bottom of the rail. Lifting on the quick-link will release the brake system, allowing the trolley to move freely

Lift the trolley to a height of 30” above the floor. The brake will engage when you release the quick-link, locking the trolley in that location.

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## Gear Motor Installation

### Floor Mount

For the quietest motor operation mount the unit on the floor using the centerline of the wall.

### Wall Mount

Position the motor assembly against the wall below the rail. Place 2 small 2x4 blocks under the motor to lift it from the floor. These will be used as temporary spacers.

**Overhead Motor** – See Appendix C Last Page.



Mark the locations of mounting holes on the motor assembly. Drill  $\frac{1}{4}$ " pilot holes and secure the motor assembly to the wall using the lag bolts provided.

Remove the 2x4 blocks from under the motor.

Line up the centerline on the wall with the centerline on the motor assembly.

Note: If mounting the motor assembly on the floor, hold the motor frame against the finished load bearing wall so the cable lines up with the top pulley's perfectly. There are plenty of mounting hole options on the motor frame.

### Connecting to controller

6' leads coming off the motor are standard. Custom length wires available.



## Top Sheave and Cable installation

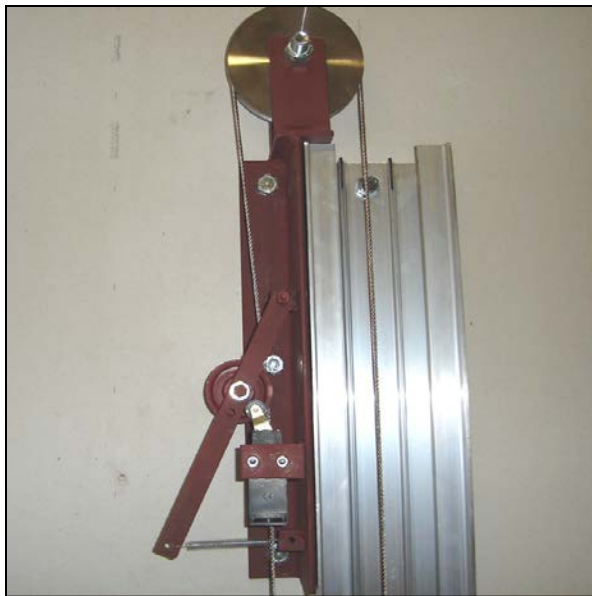
Set the pulley assembly at the top of the rail. This will stay in place at the top of the rail while you mark for pilot holes.

Drill ¼" pilot holes and secure the pulley assembly in place with the lag bolts provided.

Attach the stainless steel cable to the winding drum.

2-Level Units: Insert the end of the cable with the stop attached into the slot at the end of the drum.

3-Level Units: Insert the cable end into the pre-machined hole in the drum and tighten the set screws.



Wrap the cable 1 ½ times around the winding drum, staying in the machined grooves.

Feed the cable to the right of the small pulley and over the top of the large pulley.

Feed the cable end down the center of the rail towards the trolley, taking all slack out of the cable.

**Start of the safety circuit – is at the slack cable switch this is a manually resettable switch, pull the blue button to re-set.**

The cable must be attached to the trolley quick link using provided materials...

**The trolley should rest on the bottom trolley-stop with slack in the cable when fully tightened (see bottom pictures this page)**

Cable Clamps

Cable Thimble

Attach the cable thimble to the trolley quick link. Slip three cable clamps onto the cable. Feed the cable end through the cable thimble and through the three cable clamps.

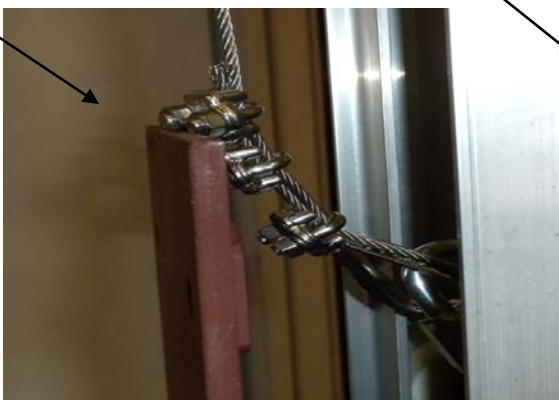
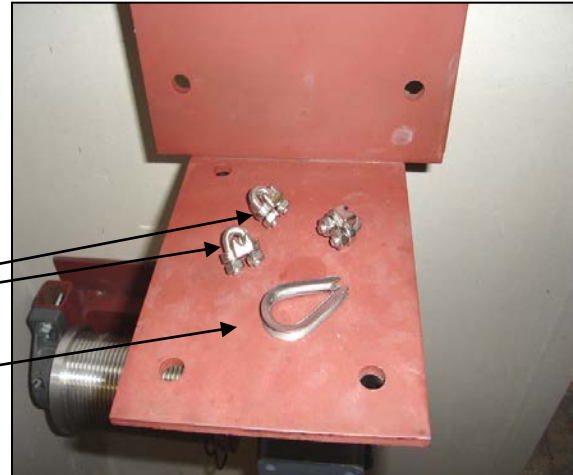
**IMPORTANT:** Arrange the cable clamps such that the curve of the 'U' is wrapping around the cut end of the cable.

Excess cable can be cut or folded and zip-tied as shown.

**IMPORTANT:** Add weight to the trolley equivalent to the cab or mount the cab to adjust the slack cable switch on the sheave assembly.

**Bottom Trolley stop 2-6" below level 1.**

**Trolley on bottom stop with cable slack**



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**The limit switches** are used to sense the location of the dumbwaiter cab and stop it at the appropriate level. Each level limit switch will connect to the call / send station pre-wired lead marked L.

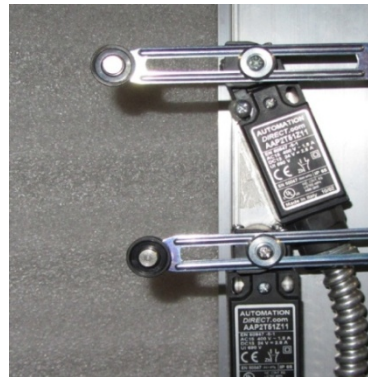
The level #1 limit switch is to be mounted vertically as seen to the (right). Peel back the film on the #1 limit switch, exposing the double-sided tape.

Mount the limit switch on the rail approximately 1" above the bottom level of the door opening. Mount the switch as shown, such that the left hole lines up with the groove along the side of the rail. This is temporary until the exact location is determined. You may need to re-position the limit switch to achieve a final location. Then use the provided self tapping screw to secure the switch. **The tip of the roller wheel should be 4-3/4" from the wall (or back of the rail).**

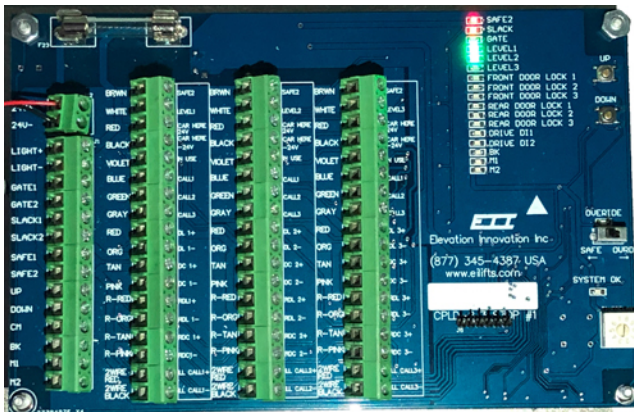
Mount the remaining switches, one for each level in the same way. **The tip of the roller wheel should be 4-3/4" from the wall (or back of the rail).**

**SAFETY CIRCUIT "Safe1, Safe2"** Run the provided 2 wire over the top of the rail that is attached to the Slack Cable limit switch on the sheave pulley assembly. Then install the upper final limit safety switch 4-6" above the top level limit switch. If conduit is required install the switch as seen to the (right) if overhead is an issue. This switch is pre-installed on the 2 wire for non conduit applications. This 2 wire will also attach to a final lower limit (if provided) and machine room door switch. This wire will connect to the "Safe1, Safe2" circuit on the CPLD board on the far left.

**Manual mode operation is described on page 10.**







## CPLD Solid State Relay Logic Controller

### **POWER OFF WHEN INSTALLING WIRES!**

**LED's** Safe2, Slack, (slack cable), Gate & BK (brake) illuminate red if circuit is open. Slack is only used on 300 and 500lb units and should have a jumper in it. 250lb units and smaller has the slack cable is inline with the "Safe2" continuity circuit. Level 1,2,3 etc will illuminate green when at that level. Any door that is open will illuminate green – lift will not operate if a door or gate is open or the safe circuit open at any point.

**Door Open circuit** is connected to the door lock system, this is a two or four wire pig tail off of each call / send station that is wired to the door lock. Door Close circuit wires into DL 1+ and DL 1-. If you have a Honeywell RDI or CDI interlock the DC+ and DC- run the 24V DC Solenoid. Rear doors wire into the R-Red, R-ORG, R-Tan, R- Pink, all other wires are doubled up in the terminal strip color for color.

**Limit Switch** circuit, this is a two wire pig tail off of each call / send station that gets wired to the N/O normally open side of the landing limit switch. When lift is at that level the corresponding LED will illuminate.

**Car Gate / Cab Light**– is wired to the traveling cable to monitor the car gate on the dumbwaiter cab, see appendix B. If the unit has a cab light this also gets wired into the traveling cable.

**Safety Circuit** starts at the "slack cable" top sheave pulley system, this has a manually resettable switch by code. This is a two wire simple continuity circuit. Next in line on the safety circuit is the upper final limit switch that is must be wired into the system. You have the choice to wire in a lower final limit switch and a machine room access door switch.

**Power in Terminal Strip**– Can be 120v 1Ph, 208V 3Ph or 230v 1Ph

**Motor Power Out** – Includes three lines, a ground and a 24 volt brake circuit for the .5Hp 3Ph motor.

**Call / Send Terminal strips** are color coded and labeled for each floor. Units will come with a wiring harness for each floor level for bi-parting or slide up door systems. If you have swing doors without built in call / sends and interlocks, you will be provided a pre-wired call send station and supplied Honeywell EMI interlocks or Commercial locks with door close circuit.

**Rear Door call / send wiring** Double up all the color coded wires **accept the rear door wires** and insert them into the rear door terminal strip below the top door, refer to the wiring diagram for colors for your specific lift.

**Do not interrupt rotary dial on the circuit board** – Position 1 is set from the factory and will make the “In Use Light” flash for 13 seconds and prevent calls from any other floor - each additional position will keep the unit from accepting a call for 8 additional seconds. In use light will flash during this time delay. Example 1 = 13 seconds, 2 = 21 seconds and so on for a total of 77 seconds. This could be modified with a custom program.

**Relay Logic Controller – Manual operation – EXERCISE EXTREME CAUTION**

To run the unit in “Manual Mode” slide the “Override” switch to the override position to the right – USE CAUTION the machine will now run up / down using the constant pressure buttons on the circuit board and you can use any call send station also – floor one button is “Down” and floor 2 button is “Up” regardless of how many floors your lift will service.

**AUTOMATIC MODE** – When the car is between floors and no limit LED is illuminated on the circuit board **THE ONLY BUTTON THAT WILL WORK IS LEVEL 1**. This way the unit will only move in the down direction when it does not know where it is.

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ALL SAFETY SWITCHES – Slack cable, final upper / lower limits and machine room door are N/C normally closed. Wire into the N/C side of the switch.

LIMIT SWITCHES FOR LANDINGS ARE WIRED – N/C Normally closed and open upon arrival. Wire into the N/C side of the switch.

## **VFD - GS2 variable frequency drive**

**To set and navigate parameters press “Program” to enter the parameter settings.**

**Press “Program” to navigate and cycle through the whole numbers.**

**Use the up and down arrows to navigate and cycle through the decimal numbers.**

**Press “Enter” to select the parameter you wish to set/change.**

**Use the arrows to set the desired parameter.**

**Press “Enter” to set parameter.**

**Press “Display” to take you back to the main screen.**

**To reset to factory settings: Set 908 to setting 99 and hit enter and you have reset the drive to factory.**

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**Redundant-RL Parameters for GS2 drive 250lb  
30 ft per minute speed 60 HZ  
.5 HP BS06-64U/D07LA4-K/E003B9HN/AVUL-SP**

**0-00: Motor Nameplate Voltage = 230 (volts)  
0-01: Motor Name Plate Amps = 2.4 (Amps)  
0-02: Motor Base Frequency = 60  
0-03: Motor Base RPM = 1620 (RPM)  
0-04: Motor Max RPM = 1890 (RPM)  
1-00: Stop Methods (Ramp to Stop) = 0  
1-01: Acceleration Time 1 (in seconds) = 0.5 seconds  
1-02: Deceleration Time (in seconds) = 0.5 seconds  
2-00: Volts/Hertz Settings (1=High Starting Torque) = 01  
3-00: Source of Operation Command = 01  
3-01: Muilt-function Input Terminals (D/1-D/2) = 00**

**You must set 3-04 to 99 prior to setting 3-02 and 3-03. Set them in the order noted.**

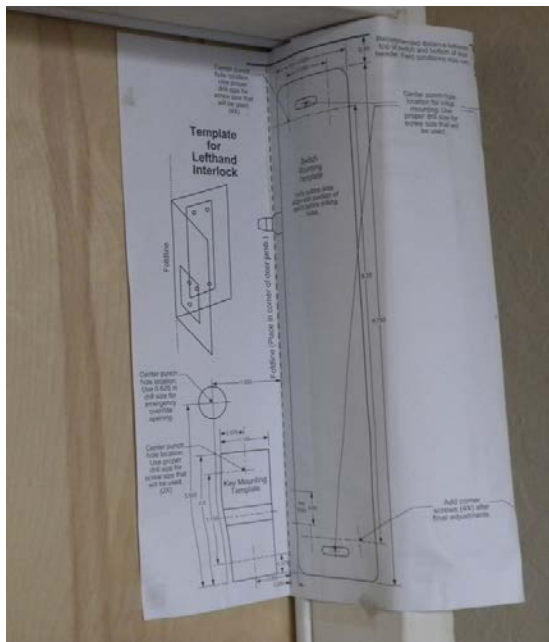
**3-04: Muilt-function Input (D/5) = 99 (input disable)  
3-03: Muilt-function Input (D/4) = 04 (Multi-speed/PID SP Bit 2)  
3-02: Muilt-function Input (D/3) = 03 (Multi-speed/PID SP Bit 1)  
3-16: Desired Frequency = 60Hz  
3-17: Desired Current = 2.4 (Drive Rated Amps)  
5-01: Multi-Speed 1 = 70Hz  
6-00: Electronic Thermal Overload Relay = 00 (0=Constant Torque)  
6-01: Auto Restart After Fault = 00  
6-02: Momentary Power Loss = 00 (Stop operation after momentary power loss)  
6-03: Reverse Operation Inhibit = 00 (0 = Enable reverse operation)  
6-04: Auto Voltage Regulation = 00 (AVR enabled)  
6-05: Over-Voltage Stall Prevention = 01 (Enable over-voltage stall prevention)  
6-06: Auto Adjustable Accel/Decel = 00 (Linear accel/decel)  
6-07: Over Torque Detection Mode = 01 (Enabled during constant speed operation)  
6-08: Over Torque Detection Level = 130%  
6-09: Over Torque Detection Time = .1 Seconds  
6-10: Over Current Stall Prevention During Acceleration = 150%  
6-11: Over Current Stall Prevention During Operation = 150%  
6-30: Line Start Lockout: Disable Line Start Lockout = 01**

# Installation Manual

## Residential or Commercial EMI Interlocks

Install the doors at each level. **DOORS MUST HAVE A LATCH TO KEEP THEM SHUT – INTERLOCKS ARE NOT A LATCH.**

The interlocks are mounted in the upper corner of the door jam, on the side opposite the hinges. The interlock ‘keeper’ is mounted on the inside of the door such that it latches with the interlock when the door is closed.



To mount the interlocks, use the paper template provided to mark mounting holes. Fold the template along the dotted line. Position the template in the upper corner of the door, opposite the hinges and use a center punch to push through the paper, marking the hole positions.

Keeper →



Drill pilot holes for each of the mounting points. Use caution when drilling pilot holes for the keeper as you do not want to drill completely through the door. Fasten mounting screws hand tight using a screwdriver. Do not use a drill to fasten these screws as you will risk over tightening.

Mount the interlock such that the keeper locks in place when the door is shut.

## Connecting the door interlocks

**Commercial CDI** Use the supplied Cat 5 cable (blue) connect to the interlock.

**Residential RDI** wire into the lock – Green =A White =B Black =C Red =D Red and Green run the solenoid circuit and white and black run the door close circuit.

**Manual door lock opening from controller: (Power off during jumper installation)** Call for assistance. Use manual mode until the proper door LED is lit, open the door and move cab with call / send buttons if needed, 2= up, 1= down



## APPENDIX A

### Installation of Stabilizer / Safety Stop Brackets

**Bottom Stabilizer Roller:** Attach if provided the opposite guide rail roller bracket with the provided hardware. Let the cab hang naturally when tightening the bolts. Run the unit in manual mode to ensure proper alignment.

This will provide a very stable cab for loading and unloading.

The opposite guide rail is a 2" x 1" x 1/8" aluminum angle with mounting hardware.

**Rail on the Left 3 stops or more:** requires that the wires for limit switch are run through conduit around the hoist-way and right through the opposite guide rail angle. Drill a 3/4" hole for the 1/2" conduit (a step drill bit may be the best option) as close to wall as possible.

#### **Top Stabilizer Roller**

Larger cabs may require a Stabilizer Bracket. If this is provided with your dumbwaiter kit, this must be installed prior to installing the trolley to insure proper operation.

Secure with supplied hardware. (Do not push the cab towards the rail, let it hang naturally).

The measurement from the axel to the edge of the cab should be 3-3/4" – 4" centered on the cab.

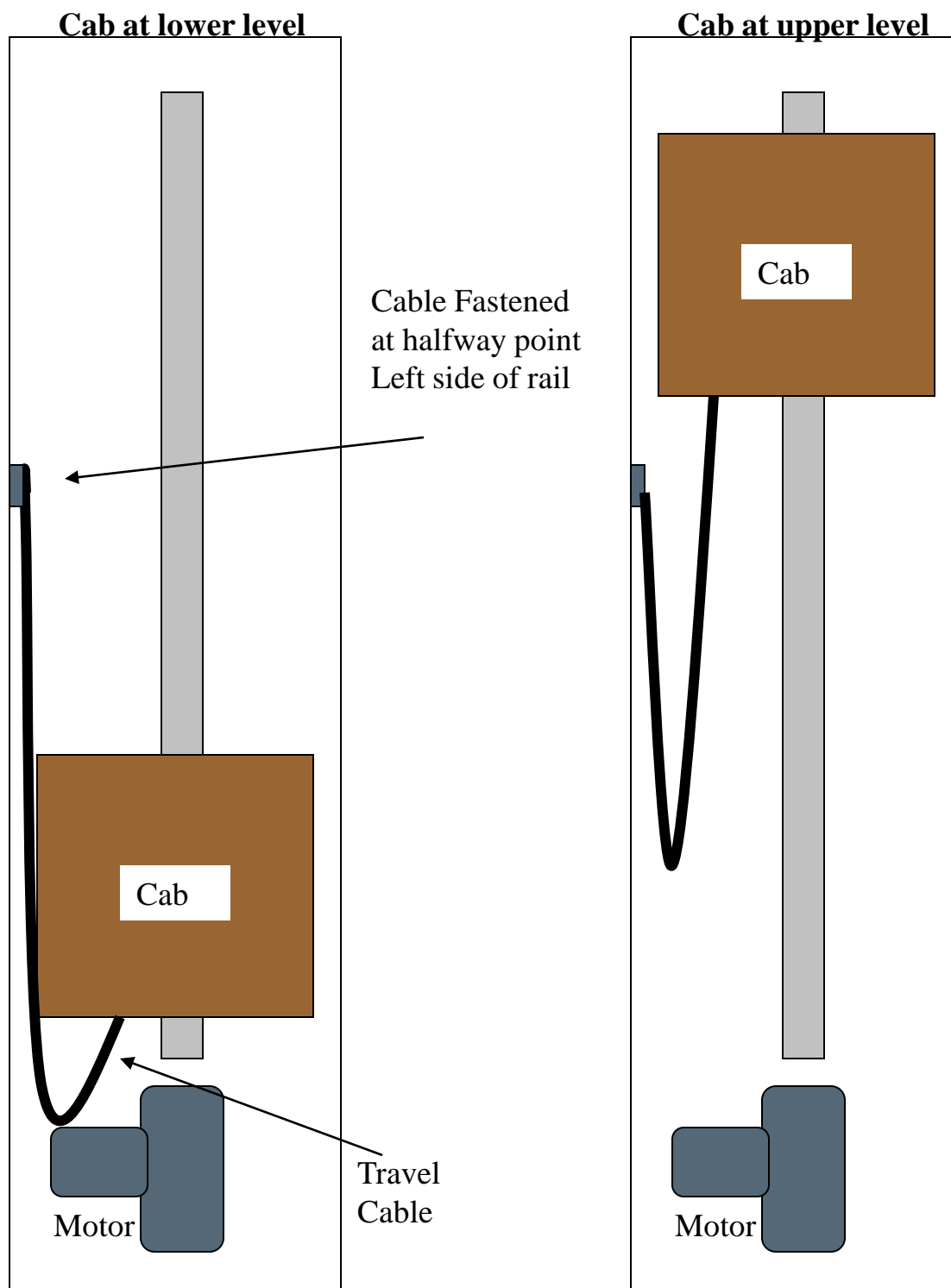
**Emergency physical car stop Top and Bottom**  
**Run the unit in manual mode** up to the final upper limit switch. Attach the 2" x 3" x 1/4" angle iron stop 1" above the car as an emergency physical safety stop. If the car hits this stop the VFD drive will go into OL. Reset the drive or cycle the power, be sure the top final limit is working. **IF STOP IS CLOSER THAN 12" TO TOP OF RAIL REMOVE THE SLING CABLE EXTENSION**



# Installation Manual

## APPENDIX B

### Installation of Gate Switch and Travel Cable



## APPENDIX B-1

### Installation of Gate Switch and Travel Cable

#### **Factory Installed Gate Switch**

Many dumbwaiters require a gate switch. This switch signals the controller when the gate is closed. The controller will not allow the cab to move unless the gate is closed.

**Bi Parting or Slide Up** use a standard limit switch attached to the gate frame – this is pre-installed on the cab with self tapping screws to attach it to the gate frame.

**Roll up gate** the magnetic switch will be active when the gate is closed as the gate will have the magnet and switch installed at the factory.

#### **Travel Cable**

Tie the cable to the underside of the cab with the provide strain relief for connection to the switch, this could be a cable strain relief or pre-installed gang box on the car.

The cable will connect to a travel cable junction box and a two or four wire will be routed to the bottom station board “Safe #1” default location – this location an be changed.

**Cab Light** - four wire will be used when the unit has a light and the car light and car gate will be connected to the **main controller**.

The cab light turns on when the car gate is opened.

# Installation Manual

## APPENDIX B

### Installation of Gate Switch and Travel Cable

**VERY IMPORTANT:** The travel cable must be hung inside the hoist-way with an anchor point at the halfway point of the dumbwaiter travel, ON THE LEFT SIDE OF THE RAIL IN THE CORNER OF THE HOIST-WAY. The cable should be hung such that it avoids contact with anything. Connect it to the cab as far away from the main guide rail wall as possible so the cable has the widest possible bend in it. When the cab is on the bottom floor the cable should droop below the cab but not touch the floor.



The two wires must be connected to the travel cable and routed through conduit to the level 1 station board “Safe #1” safety, or the main controller board with four wires if a light is used. If this is the case there will be a terminal strip in the main controller

**VERY IMPORTANT:** When the dumbwaiter cab is at the lowest level, the travel cable should have slack. It should hang above the motor assembly to avoid catching on anything during movement.



## APPENDIX C

### Overhead motor and sheave

Mount motor as close to the top of the shaft as possible using the centerline on the winding drum to align with shaft / guide rail centerline. Motor is horizontal.

#### Double pulley for 250Lb units

Mount the sheave assembly the maximum distance down from the winding drum (minimum 36" from the winding drum to the sheave wheels) using the centerline on the sheave assembly to align with the shaft centerline. 5" pulleys closest to the motor as shown.

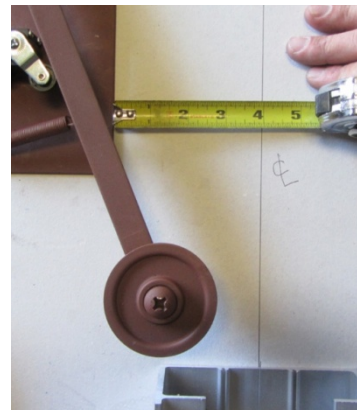
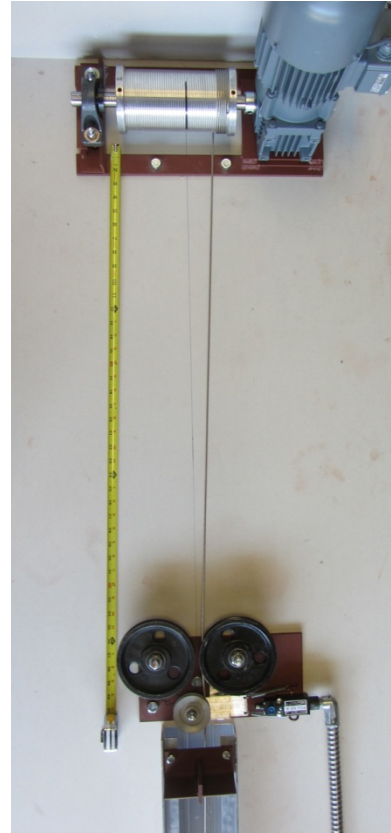
Motor direction have been factory set for proper direction of travel.

\*\*\*With a top stabilizer roller on the cab you need a minimum of 8" of rail above the top of the cab for over travel and top physical stop.

#### 18' of travel or less overhead sheave

#### Residential – no top roller bracket

Mount the unit above the track 1-2" and the right edge of the assembly is 4" left of the track center line.



# Installation Manual

## Trouble Shooting Guide

The unit will not run if the “Safe2”, “Gate” or any door lock LED is illuminated

Never install any wires into the circuit board when the power is turned on you can short circuit the board and you will be liable for the cost of the repair. All boards are thoroughly tested prior to shipping – every circuit.

**AUTOMATIC MODE** – When the car is between floors and no level LED is illuminated on the circuit board **THE ONLY BUTTON THAT WILL WORK IS LEVEL 1**. This way the unit will only move in the down direction when it does not know where it is.

Note – You can put a jumper wire on the circuit board for any safety to prove the control board is operating properly – never leave a jumper installed during automatic mode, never install a jumper when the power is turned on.

**Safe2 LED illuminated** – This is a two wire continuity circuit. This includes the “Slack Cable” switch on the pulley system, this is a manual resettable switch. The “Upper Final Limit” (a safety switch above the top floor limit switch) that is attached in the factory. It may also include a “Lower Final Limit” below the bottom floor limit switch and the “Motor Access Switch” (machine room door). These switches must be installed in line – refer to the wiring diagram provided. If illuminated one of these switches is activated. If it is the “Upper / Lower Final Limit” this means the dumbwaiter passed the upper / lower floor landing limit switch. Inspect the top / bottom floor limit switch for: Proper activation this switch should be 4-3/4” from back of the rail to the tip of the roller. Wired into the N/C (normally closed) side of the switch, and that it is connected properly to controller.

**Gate LED Illuminated** – This LED is illuminated when the car gate is open or the connection is broken. Check the wires on the gate switch on the car, check the connection at the black travel cable, check the travel cable to controller wire in the half way junction box, check the connection on the circuit board in the controller.

**Door Lock LED** – Indicates that a door circuit is open and the dumbwaiter will not run. If the door is closed and the LED is on check the wiring for this door lock all the way back to the controller starting at the door lock, then the call station flying leads and finally the controller circuit board.