

## INSTALLATION INSTRUCTIONS



Phone: 800.526.0026 Fax: 954.917.7337

Always Smooth Sailing

## **SAFETY NOTICE**

# WARNING!

These guidelines must be followed to ensure safety and proper installation. Failure to follow these instructions could pose a safety hazard and will void the limited warranty. Any installer who deviates from these instructions shall be taken to agree to indemnify, save and hold harmless the manufacturer from any and all loss, liability or damage, including attorney fees as a result of such deviation.



There is a potential safety hazard for new and existing residential elevators. In many elevators with swing-type hoistway doors and accordian gates, the space between the car gate and the hoistway door can be as wide as 7 inches or greater. This space is wide enough for a child or small adult to become entrapped between the car gate and the hoistway door when the hoistway door closes. There have been multiple deaths and serious injuries on elevators equipped with swing-type hoistway doors, in which children who were trapped in this space were crushed or killed when the elevator car moved. ••A safety light curtain will be supplied for each hoistway entrance.

ASME A.17.3 - 2002 Safety Code for Existing Elevators requires that when the distance between the hoistway door and car gate is greater than 4 inches (100 mm) or 5-1/2 inches (140 mm) for a car door, a space guard should be installed in accordance with ASME A17.3.

See page 39 for details.

## FLOW CHART & TOOLS REQUIRED

Listed below are the tools required and a flow chart outlining the process of a general installation. Each box of the flow chart will refer to a section outlining specifics to that step.

Please refer to the User's Manual for warranty information and operating instructions.

All steps, procedures, prints, and labels, ect. should be fully read and understood before proceeding. Information provided on the approved prints and equipment supersede information in the instruction manual.

Please inspect all materials and hardware prior to beginning installation. Report any damaged or missing items immediately.

#### **TOOLS REQUIRED:**

The following items and tools are required for installation. Additional items may be needed.

- Construction / Control Pendant (Run/Stop)
- Flex Conduit between power source and controller power supply

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- Screw drivers (Phillips & Flat Head)
- 4' Level
- Framing square
- 25' Measuring tape
- Drill 3/8"
- Hammer drill ½"
- Drill bits
- Chalk line and plumb line
- Allen key wrenches
- Pliers
- Box cutter
- Side cutters
- Wire strippers
- Wire crimpers
- Rubber mallet
- Socket wrench set
- Chain hoist / Wire rope winch
- Large crescent wrench

## FLOW CHART & TOOLS REQUIRED

- Multi-meter
- Sawzall
- 3ft long 4x4 and 5ft 2x4 wood boards for testing slack chain brake system
- Ladder
- Safety equipment
- Scissors
- Marker
- Extension cords
- Vise grips
- Shop vac
- All-purpose grease
- Silicone sealant

#### **FLOW CHART**



#### **PRELIMINARY CHECKS**

Installer: Prior to installation, verify that the following items are available at the jobsite and that the dimensions of the job site conform to the approved engineering drawings.

- The floor-to-floor dimensions and the pit depth match the dimensions on the print. Take into consideration the finished flooring. Do not proceed if these do not match. New rails, chain or travel cable may need to be ordered.
- Overhead clearances must match the print. Interference may occur if this dimension is not correct.
- Verify hoistway width and depth meet information on approved drawings. Check to make sure the hoistway walls are plumb. If not, running clearance may have interference.
- Verify the guide attachment wall is square with the door openings.
- Ensure the guide attachment wall is capable of supporting the rail reactions noted on print. See wall construction details on approved drawings.
- Review all electrical requirements prior to installation. Refer to the approval drawings for electrical specifications.

If alterations are needed, contact the contractor for modifications as required.

#### **SECTION 2**

#### **RAIL ASSEMBLY**

These instructions are for building the rail system, starting with the rail tower base assembly.

1. Verify the pit depth and the travel from the lower landing to the top landing match the

approval drawings. If these do not match, you may need new rails or chains.

2. Locate the following items to begin assembly of the rail tower base unit.

- (1) Base plate
- (3) Rail brackets
- (2) Unistrut
- (1) Hardware Kit Kit, Base Rail Hdw GRLS

3. Determine rail tower position. Use approval drawings for centerline information.

• It is important that the rail tower is plumb. Ensure the machined surface of the rails are plumb with a plumb line as the rail tower is erected.

4. Clean the guide rails using mineral spirits or comparable cleaner. The grease must be removed from the rails for proper operation.

5. Depending on the configuration of your elevator your application drawing will use a wall to either the left or the right of the rail backing when calling out a centerline.

Now that you have a center line hanging, measure 7" towards the reference wall and snap a

chalk line. Do the same chalk line 7" in the other direction.

6. Make a mark at the top and bottom of the shaft at the final level line mark. Stretch a chalk line across the marks and snap a line. Check with a 4 ft level to be sure it is plumb.

You now have a template to work from. Your rail brackets will line up on your plumb lines and the horizontal marks you just made will tell you at what height to place your rail brackets. See Fig 1A.



7. Adjust the rail base plate so that it is level. Adjustment may require shimming. When drilling, be sure that you drill though a minimum of 3" of wood to verify there are two backing boards. If the drill breaks though at around 1-1/2", there is only one backing board and the shaft construction needs to be rebuilt. Do this at each mounting locations.

8. Drill 5/16" pilot holes up one side of the rail backing at the marks for each of your rail brackets.
 9. Measure your rails, the top rails may be cut for overhead clearance. Be sure to use the 96" rails for bottom and middle construction.

10. Bolt the T rails to the bottom plate. The "T" points outward, the rail with the male end at the top goes on the left side of the base plate (when looking at front of rail brackets.) Bolt the T rail to the rail bracket sides with the ½" bolts, a washer and a nut. Tighten to 40-45 ft-lbs of torque.



7

12. Once you have the rail tower base assembly built, you can insert the counter weight carriage.The counter weight carriage slides along the



13. Make sure the splice joints are inserted into the Unistrut before placing the next piece of rail. For fitting purposes it may be easier to fit the Unistrut joint all the way into the Unistrut so the joint does not protruded. Then, once the rail is placed, slide the Unistrut joint back into place and tighten.



14. Use an overhead hoist to raise a new T rail section into place and engage the tongue and groove on each rail side. See Fig. 4.



15. Fasten fish plates to the rail joints with the
½-13 x 1-1/2" Hex Head Bolts and nuts. No washers are used here. The nuts go on the inside.
See Fig. 5.



16. Place the Unistrut splice over the center of the Unistrut joint. If there is any misalignment, loosen the bolts above and below the splice and align the joint. Retighten all hardware. See Fig. 6.



At this point make sure that your rail and Unistrut are still square with the bottom plate and the rail brackets. Use a 4 ft level to ensure that all rails are going up straight.

Note: If you have any burrs or rough spots along the rail or Unistrut joints, use a file to smooth them out. The smoother the joints the better the ride quality.

17. Attach your last section of T rails just as you did with the middle and bottom sections. The top rails may be a custom length and will be flat on the tops.

18. Once all the rails and Unistrut have been installed, place the top plate on the rail structure. The top of the plate should be perfectly level. This is some room to adjust in the mounting holes to allow for small adjustment. A ¼" gap is allowed between the top of the Unistrut and the bottom of the top plate. See Fig. 7.



#### **COUNTERWEIGHT ASSEMBLY**

 Place the counterweights in the counterweight carriage. Place them in at an angle for easier installation.

Note: When placing weights, pull them close to the front of the carriage away from the wall. This is to prevent the weights from scraping any bolt heads or studs used in mounting the rail brackets.

2. Once all the weights are installed, mount the weight clip using the hardware attached. The clip can be mounted either way, just ensure full engagement against the weights. It will not be flush against the carriage. See Fig. 8.



3. The connecting rods should be installed in the weight carriage already, if not, place the connecting rods as shown. See Fig 9.





#### **Safety Notice:**

These instructions will illustrate how the counter weight limit switch should be installed. This is to prevent, in case other safety features fail, the counter weight assembly from over traveling in the up direction. This switch should be wired in series with other safety limit/stop switches.



#### **DRIVE ASSEMBLY:**

**1.** Mount the sprocket and pillow block bearing to the shaft. Install the sprockets with the hubs facing each other. Space the inner sprocket approx. **1.5**" from the face of the gear box.

2. Hoist the motor mount plate on top of the top plate assembly and align holes.

**3.** Hoist the drive unit assembly to the top of the rail tower and attach using 5/8-11 bolts, lock washers and flat washer. See Fig. 10.

Caution! Drive assembly weighs approximately 150 lbs. Serious injury can occur from improper handling or hoisting.



**4.** Loop each #60 chain over the drive sprockets. The chains should be positioned on the sprockets in equal lengths. Drop the chains so the end of the chains are near the top of the counterweight carriage.

## **Section 5**

#### **CHAIN GUIDES**

Chain guides are provided to reduce chain oscillation and vibrations. They guide the chains as they come off the sprockets for a quiet smoother ride. One guide is provided for the car side and the other for the counterweight side.

**1.** Attach the counterweight chain guide to the top welded assembly. Use the lag screws that mount the top welded assembly to the wall.

2. Mount the car side chain guide assembly to the top welded plate using hardware provided.

3. Adjust the guides so they ride in the center of the chains, on the roller portion of the chain.

**4.** Run the elevator up and down to verify the guides make proper contact, adjust again as needed. See Fig. **11**.





#### **SLING ASSEMBLY**

**1.** Assemble sling parts to rails as shown below. Hardware kit used for assembly is SEES-HL-001-90.

2. After the sling has been assembled, verify the stile extensions and the cross support bar are square with each other. The base plate can be used as a guide to square up the components

**3.** Slide the brake linkage over the brake pins on each side before bolting stiles together. Straighten brake pin as needed. See Fig. 12. The #60 chains should be hanging by the counterweight assembly.



4. Connect the chains to the connecting rods on the counterweight assembly, using the master links provided.5. Run the car in the down direction to raise the counterweights and to lower the loose end of the chain to the sling connecting rods.

Caution: If the counterweights hit the top plate before the chain reaches the sling, the chain is too short. Warning! The counterweights are now suspended from above without any safeties!

6. Connect the chains to the sling assembly. Sling should be setting on the bottom plate.

Note: The cab floor can now be placed on the sling to aid in the rest of the assembly/installation.

7. Verify the cab floor will go to the top landing with enough over travel to actuate the final upper limit switch without the counterweight crashing into the bottom plate. If it does reach the bottom before this, the chain is too long.

**8.** Adjust the lower eccentric to allow a 1/16" gap between the T guide rail and the safety break wedge block on the brake. The knurled roller should not contact the rail during operation. See Fig. 13.



9. Adjust the top eccentric rollers to plumb the stiles.

At this point, for the car to work properly, weight must be kept on the floor to prevent the safeties from catching.

**10.** Verify the slack chain safety brake functions properly.

Caution/Danger! These steps must be read and followed properly. Any deviation from this procedure could cause injury and or death.

- a. Place the test weights on the car floor (equal to the capacity of the elevator.)
- **b.** Raise the sling to a position where you can fit a 4 x 4 block of wood underneath the sling assembly.
- c. Lower the sling onto the board until there is slack in the chain.
- **d**. While standing clear, use a 60" 2 x 4 to knock the 4 x 4 out from under the sling. The slack chain safety should lock onto the rails when the board is released.
- e. Run the elevator in the up direction to release the brakes.

Sufficient weight may be needed on the car floor to prevent the safeties from dragging on the rails.

#### SLACK CHAIN SWITCH ASSEMBLY

 Attach the slack chain switch assembly. Adjust the tab so it is just touching the switch lever.

2. Run conduit underneath the cab flooring, using the conduit hook for mounting.

See Fig. 14.



#### **SECTION 8**

#### SELECTOR TAPE MOUNTING BRACKETS

**1.** Attach bottom mounting bracket to first rail bracket, just above the bottom plate assembly. Use existing hardware.

2. Assemble the bottom tension bracket assembly. Loosely screw nut on tension rod with spring, leave room for adjusting tension after final assembly.

3. Attach the top mounting bracket to the top plate assembly or the top rail bracket.Can be mounted to either one depending on clearance.

**4.** Use clamp plate to secure selector tape to the top mounting bracket. Allow tape to drape down to the bottom bracket.

5. Clamp tape to the bottom bracket assembly and pull tight. Cut tape as needed.

**6.** Adjust tension in tape by adjusting nut against spring.

7. Mount Selector to top of cab after final cab assembly. Use adjustable brackets provided. See Fig. 15.



#### **FINAL LIMIT BRACKETS**

**1.** Attach the upper limit bracket to the rails. Place in location where any over travel from the top floor will activate the limit switch.

2. Mount the limit switch assembly to the top of cab.

3. Mount lower limit switch bracket to rails. Place in location to prevent travel below first landing.

See Fig. 16.



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See page 39 for details.

## **SECTION 11: EMI CONTROLLER MANUAL**

#### **Table of Contents**

Section	Contents	
1	Introduction	
1-1	Support Information	
1-2	General Information	
1-3	Special Operations	
1-4	Inputs & Outputs	
1-5	Wiring Information	
2	Parameters	
2-1	Parameter Description & Function	
2-2	Fault Flash Codes	
3	Programming Tool	
3-1	Programming Tool function	
3-2	Connecting the P-Tool	
3-3	Programming Mode	
3-4	Fault Log Mode	
3-5	View & Clear Counters	
3-6	Parameter Setting	
4	Temporary Run	
4-1	Initial Temporary Run	
5	Identifying the Software Version	
5-1	How to identify your Software version	
5-2	Software Enhancements	
6	Common Questions	
	Call button Fault Flash	
	Automatic Car Light	
	Miscellaneous	
7	Fault Troubleshooting	
8	Maintenance	

#### **SUPPORT:**

If you do experience a problem, or are not sure of the correct operation, please call the factory for assistance. In most instances we can help resolve the situation quickly without extensive loss of time on the job site. When assisting on a unit, it is more efficient to talk directly to the installation technician. This not only reduces the chance of miscommunication, it also reduces the time required for the technician to get the information he needs. When calling, always have the unit's serial number and a P-Tool available. EMI is available to accept your calls from 8:00 am to 5:00 pm, Central Time, Monday through Friday.

Electro-Mech Industries Inc.

Arlington Heights, Illinois 847-593-4900

#### **1-2) GENERAL INFORMATION:**

The 4M2 control board contains the following features:

- Same control board is used for all 3 models of Elevators
- UL recognized for Residential Elevators
- Supports 2 through 4 stop units
- Supports Porta Power Gate operators (maximum of 2)
- Supports Swing Door operators (maximum of 4)
- Allows use of GAL or Electric Locks (24 vdc)
- Supports Retiring Cam function (Additional relay req'd)
- Automatic or Constant Pressure Controls
- Allows for "Short Floors" (12 inch minimum for Automatic operation and 24 inch minimum for Constant Pressure operation)
- Red LED's on inputs
- Yellow LED's on outputs
- 110 vac coils on Contactors and Valves
- 20 event Fault Log feature
- Log viewable with Programming Tool
- Parameters can be field modified
- Fault Flash code to help identify the type of problem
- Trip and Re-level counters
- Sabbath Control feature
- During a power failure or Overload activation, the car, if not at a floor, will automatically lower to the next level down.
- Control can be set to a Temporary Run mode for use during installation

#### **1-3) SPECIAL OPERATIONS:**

**1.** Board Re-set: Any time that the controller is powered up, or the star key on the P-Tool is pressed, the system will automatically go into a Re-set sequence. During this sequence, if all of the required safety circuits are made (normal run requirements), the Unit will respond as follows:

- A. If not at a floor, unit will automatically lower itself to the first floor encountered.
- B. If at floor level, unit will re-set and then return to normal operation.
- C. If in a floor Zone but not level, unit will move to that floor level.

Warning: If you jump out key safety circuits and then the power is turned on, or the re-set key is pressed, the unit may move when not expected. This can create a hazardous situation that could cause injury or even death. Do not jump out safety circuits.

Provisions have been made to run unit on Temporary Mode, which will be explained in this manual.

#### **1-3) SPECIAL OPERATIONS, Continued:**

2. Emergency Lowering during Power Failure: Once the controller senses a loss of power, the emergency light output "EL" will activate and the buzzer output "BZ" will pulse for 1sec every 15 sec. The elevator will respond as follows:

A. Power loss during an UP run, the destination call will be dropped and the unit will automatically lower itself to the next lowest floor. If that floor is not the lowest landing, car can be moved to a lower landing by pressing the selected floor button.

B. Power loss during a DOWN run, the destination call will be dropped and the unit will automatically lower itself to the next lowest floor. If that floor is not the lowest landing, car can be moved to a lower landing by pressing the selected floor button.

C. Power loss while at a floor, unit will stay at the floor level. If a call is placed to a lower floor, and all normally required safety circuits are in the correct state, the unit will lower to the requested floor.

Note: The "EL" and "BZ" output will disable themselves 30 sec after the lower terminal floor had been reached.

3. Run Timer: If the Run Timer times out unit will respond as follows:

A. Hydraulic unit running up, unit will respond the same as in Emergency Lowering.

B. Hydraulic unit running down, unit will stop and shut down. If unit is level at a floor and power gates are being used, the gate will open.

C. Drum units running up or down, unit will stop and shut down. If unit is level at a floor and power gates are being used, the gate will open.

Note: In order to reset a drum unit after a Run Timer trip, you must manually move the car to a floor level before a reset can be performed. Floor level is selector inputs DZ & PX on and UL & DL signals off

4. Power Gate:

A. If the open command is given (OPR or OPF) and the gate does not open within 2 seconds, the open command will turn off for ten seconds and then retry the open command. After 3 attempts without the gate opening, the unit will wait for another open request.

B. Sequence is the same for closing; a failure will allow 3 attempts before call is cancelled.

5. Sabbath Control: When input IN1 is activate (+24V) the unit goes to Sabbath mode and will respond as follows:

A. Unit will travel to the Lower Terminal Floor (LTF) and disable a calls.

B. Wait one minute at LTF, then run up to the next highest floor.

C. Wait one minute at floor, then run up to the next highest floor.

D. This will repeat until the Upper Terminal Floor (UTF) is reached.

E. When the UTF is reached unit will wait one minute then run down to next lower floor.

F. This will repeat to each next lower floor

G. When LTF is reached the unit will wait 15 minutes then begin run cycle again.

H. When the IN1 input is deactivated, the unit will return to normal operation.

20

#### **1-4 INPUTS AND OUTPUTS**

Most of the inputs and outputs are easy to identify but here is a brief map to identify them and their location on the logic board.

#### LED Indicator



car lights are off.

21

#### **1-5) WIRING INFORMATION:**

**1.** Schematic drawings: (Refer to the drawing with the SCH suffix). These drawings show a system with all features and control options that are available with the 4M2 controllers.

Note: All wiring shown below the terminals, shown as a circle with a square around it, are circuits or connections outside of the logic board. Wiring shown above those terminals, are circuits that are on the logic board.

**2.** Hook up drawings: (Refer to the drawing with the FLD suffix) These drawings show a system with all features and control options that are available with the 4M2 controllers.

Note: Logic board terminals are shown as a square with the nomenclature inside. All other connection points are shown as circles.

**3.** Travel Cable connections at the controller: When bringing the traveling cable into the controller, be sure to allow enough length, inside the box to reach all needed connection points. Some connection points are on the logic board while others are on the terminal strip.

4. Hoistway wiring: You should allow enough cable to run each device back to the controller for termination. Drawings are set up based on this "home run" principle. The drawing shows optional devices that you may not have, or will not use, on your unit.

Note: The entrance points for the field wiring should be determined and knockouts installed with the panel removed from the box. This eliminates the possibility of metal shavings dropping into the controls. If you do not remove the panel, you must adequately cover it to protect from shavings

#### 2-1) PARAMETER DESCRIPTION & FUNCTION

The controller parameters are set to factory default. You will need to configure each controller to the specifics of that installation.

**1.** Password: Factory default is 12345. Password must be 5 characters in length and must be numbers. The A,B,C,D keys cannot be used for password.

Note: If you change the password, use one that you will not forget. If you forget the password you will not be able to access the Program menu. The only recourse for access is to return the control board to the factory for a password re-set.

- 2. Number of Floors: {default = 2} Selection is 2, 3, or 4.
- 3. Single Automatic PB: {default = Y} "Yes" is for automatic, "No" selects Constant Pressure
- 4. Drive System: {default = 0} Selections are (0) Drum or (1) Hydro
- 5. Fixed Cam: {default = 1} GAL locks require (1) Yes, EMI locks or retiring cam require (0) No

6. Delay Up Stop: {default = 0} Used only on Hydro applications to create a larger dead zone be-

tween top of magnet and UL sensor. This helps reduce or eliminate re-leveling due to temperature or loading variations. Time increment is 10 milliseconds; range is 0-200

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7. Run Timer: {default = 90} All units. Time increment is in seconds, range is 30-180

#### 2-1) PARAMETER DESCRIPTION & FUNCTION, Continued:

8. Car light Timer: {default = 5} This is for the automatic car light and determines the time that the car light will remain on after completion of a call when the car gate and hoistway door are closed.

Time increment is minutes; range is 1-10.

**9.** Non-Interference Timer: {default = 10} Time between the completion of a run and the acceptance of another call. Time increment is seconds: range is 2-60.

**10.** Car Call Cancel Timer: {default = 10} This is the time that a call will be held while a gate or door is still open. If gate or door is not closed within this time period, the call will be dropped. Time increment is in seconds; range is 0-60.

**11.** Automatic (Power) Gate: {default = 0} Selections are (1) Yes, or (0) No. If Yes is chosen then parameters 12-17 will show for selection entries. If No is chosen, then you will not see these parameters. These settings control which gate open signal is present for that floor. Floors that do not coincide with your number of stops may be ignored, as they will not have any effect on the system. Example: 3 stop unit, default entry may be left for the 4th floor.

"Rear" indicates use of two gates, the second gate may also be located adjacent.

12. Floor 1 Gate: Selections are (1) Front only, (2) Rear only, (3) Front & Rear opening.

13. Floor 2 Gate: Selections are (1) Front only, (2) Rear only, (3) Front & Rear opening

14. Floor 3 Gate: Selections are (1) Front only, (2) Rear only, (3) Front & Rear opening

15. Floor 4 Gate: Selections are (1) Front only, (2) Rear only, (3) Front & Rear opening

**16.** Gate Open Timer: {default = 15} Time that the power gate is open after completion of a call. This includes the time that it takes the gate to open. Time increment is seconds; range is 5-60.

Note: Enhanced on Software version 1.3. Refer to sec. 5-2 for details.

**17.** Gate Re-open Timer: {default = 10} Time that the power gate is open after a door open button is activated, or a call, from the floor where the car is parked, is registered. Time increment is seconds; range is 5-60.

**18**. PreOpening: {default=0} Selections are (1) Yes, or (0) No. If YES is chosen it allows the gate to be opened as the car approaches the destination landing. For the car to continue to the destination landing the selector signals "DZ" and "Px" must be on. Only applicable with manual gates

Note: Present on Software version 2.0 and above

19. G & D Timer Cancel: {default = 1} Selections are (1) Yes, (2) No. If Yes, is chosen, then the

Gate Open time and DC time settings will be interrupted and canceled when a call is placed.

Example: If you have chosen a open time for power gate or power door to be 20 seconds, and a call is registered after 10 seconds of open time, the remaining 10 seconds will be cancelled and the gate or door will start to close immediately upon the call being placed.

Note: If your power gate and/or power door unit is being used in an application where the user may need most of the open time to enter or exit the car, then you may want to set this selection to (2) so the open time always remains at the setting.

**20.** Homing Floor: {default = 0} Allows home return feature to selected floor. Selections are (0) No homing, (1) to 1st, (2) to 2nd, (3) to 3rd, and (4) to 4th.

#### 2-1) PARAMETER DESCRIPTION & FUNCTION, Continued:

21. Homing Timer: Time car parks at a non-home floor, after the gate & door are closed, before returning to Home floor. If Gate or Door is open, unit will not Home return. Time increment is minutes; range is 1-30.
22. DC Timer: {default = 15} The time that the 1EL thru 4EL & PD1 thru PD4 outputs remain on, after a completion of a run or door re-open activation. Time increment is seconds; range is 0-60. If set at (0) then output will remain on until a call is placed.

Note: The 1EL thru 4EL outputs supply the feed for Electric locks and Car Here lights while the PD1 thru PD4 outputs supply the "Open" signal for power Hoistway Door openers.

**23.** Short Floors: This feature inhibits the high speed run (VF Drum & Hydro) between the floors indicated. Minimum floor to floor allowed for Automatic pushbuttons is 12 inches. Minimum floor to floor allowed for Constant Pressure pushbuttons is 24 inches.

Short Floor 1-2: (Short floor between 1 & 2) Selections are (0) No, (1) Yes.

Short Floor 2-3: (Short floor between 2 & 3) Selections are (0) No, (1) Yes.

Short Floor 3-4: (Short floor between 1 & 2) Selections are (0) No, (1) Yes.

24. Call Button Fault: {default = 0} Selections are (1) Yes, (0) No. If "yes", a code is flashed, at the call button when the unit is unable to accept a call. Factory setting (1) Yes. See Section 2-2 for detail on Fault Codes Note: Enhanced on Software version 1.3. Refer to sec. 5-2 for details.

**25.** Re-level shutdown Counter: (Hydro only) {default = 5} If unit re-levels the number of times set in the counter, during the time period set on the Re-level shutdown Timer, car will return to the bottom terminal floor and shut down. Range is 0-10, (0) disables the function.

**26.** Re-level shutdown Timer: {default = 2} If number of re-levels equal counter setting, before the timer setting expires, car will return to the bottom terminal floor and shut down. Time increment is minutes; Range is 0-10.

**27.** Auto shut down counter: {default = 0} If activated, car will shut down when number of runs equals counter setting. Number of runs equals the setting times 10. This feature auto-disables after four activations.

**28**. Sabbath: {default = 1} Selections are (1) Yes, or (0) No. See section 1-3.5 for a description of operation. It is recommended to leave this parameter to its default.

**29.** Service Interval Counter: {default = 0} If activated, the emergency light will flash 3 times at the start of every run when the number of runs is greater than the parameter setting. Number of runs equals the setting times 10. Clearing the counter from the main menu option 4 resets this feature.

#### 2-2) FAULT FLASH CODES:

All codes that begin with a long flash (2 seconds on) are Call for Service codes. These are problems that the user can not correct. The main purpose of these codes is so a user could convey to you, over the phone, the flash sequence. This may save a trip to the site if it is one of the User codes, or could give you an idea of what parts you may need to take with you, when you go to the site, if it is a call for service code.

Call For Service (1): One long, one short. This code indicates that there is a problem is one of the following areas:

Overload Trip Run Timer Trip Main Safety Chain open

Door lock fault Auto Shut Down counter

#### 2-2) FAULT FLASH CODES, Continued:

- Call For Service (2): One long, two short. This code indicates that there is a problem is one of the following areas: Re-level shutdown Low Pressure Switch
- Call For Service (3): One long, three short. This code indicates that there is a problem is one of the following areas: Selector Fault Selector Encoding error Position Error
- User Code (1): One short. This indicates that the Gate is open, or the In-car stop is in the stop position.
- User Code (2): Two short. This indicates that a Door is open.

#### 3-1) PROGRAMMING TOOL (P-TOOL) FUNCTIONS:

The P-Tool is available in either a board mount or held versions. The recommended minimum is that each installation technician have a P-Tool.

The P-Tool can be used to:

- View the status of the elevator
- Change parameter settings
- View and clear the fault log
- View and clear the counters
- Put the system into Temporary Run Mode
- Run the elevator while in Temporary Run Mode

Note: While using the P-Tool in programming mode, the elevator will not respond to calls

Note: The P-Tool is rendered in-operable while the elevator is running. The elevator must be at rest.

#### **3-2 CONNECTING P TOOL:**

#### \*\*\* WARNING \*\*\* USE OF THE PROGRAM TOOL IS FOR PROFESSIONAL ELEVATOR TECHNICIANS ONLYI CONNECTING THE P-TOOL TO THE CONTROL BOARD

- Socket postion is on lower edge of board (Location shown below)
- 2. Move locking tabs on socket outward
- 3. Insert P-Tool plug into socket

Note: Plug & Socket are polarized. Match key on plug to slot on socket

4. Press the (1) Key (Display will show current status of the Elevator)



#### 4-1) TEMPORARY RUN MODE:

The purpose for this mode of operation is to allow the installer to move the platform up or down during the installation process. During this mode of operation safety chains MSC, LPS, GC, HDC and HDL will be disregarded. If the motor overload connected to PT1 and PT2 opens, the platform will not move.

Before the platform can be moved the following electrical connections will need to be made:

Drive system (hydro or drum) including motor overload

L1, L2 & N

SW1 & SW2

The following jumpers are required:

From TLC to LT

- From TLC to UT
- From 24V to HDL

Temporary run mode can be initiated in either of the following:

- Hold keys 1, 5 and 0 on P-TOOL, then power up
- Logic board Inputs P1, P4 and DOB tied to REF, then power up

The platform will travel UP by constant pressure of either of the following:

- "A" key of PTOOL
- While logic board input 4C is tied to REF

The platform will travel down by constant pressure of either of the following:

- "D" key of PTOOL
- While logic board input 1C is tied to REF

Note: During Temporary Run Mode, the platform will move at low speed.

To return too normal operation, remove power then power up without the initiating conditions.

#### 5-1) IDENTIFYING THE SOFTWARE VERSION:

Periodically we enhance or add features to the operational software. If you call for assistance on a unit, you may be asked to identify the software on your unit.

There are two ways to identify your software:

1) The date stamp on the 40 pin EPROM.

2) Connect the Programming tool, perform a reset by pressing the star key and reading the version that shows on the upper right side of the display. Note, if a ? mark is displayed it is an indication that you have the first version of software. If you have a revised version, you will see a "V" followed by an identifier (1.1, 1.2, 2.1, etc).

#### **5-2) SOFTWARE ENHANCEMENTS:**

#### Version 1.3 Dated November 14, 2005

Gate Open Timer: Range is 0-250 sec. Where "0" will park the gate(s) open. Call But. Fault: Selections are, 0-NO 1-A 2-U. If "A" is selected ALL codes will be allowed to flash. If "U" is selected only the user codes will be allowed to flash.

Version 2.0 Dated December 3, 2007

Added parameters: PreOpening and Sabbath

#### Version 2.1 Dated March 25, 2009

Code compliance for gate monitoring. If the hoistway door (HDC) is opened, the gate (GC) must be cycled for the system to accept a call.

#### Version 2.2 Dated April 8, 2013

Service Interval Counter: Range is 0-250.

#### 6-1) COMMON QUESTIONS:

#### FAQ

#### A. Call button flashes

(Q): I press a button to call the car to my floor, the button flashes but car does not move. Why is the button flashing?

(A): When the car is not allowed to move, which can be for a number of reasons, a fault flash code is displayed at the button pressed. If the flash sequence is one long (2 seconds on) and then followed by a short (1/2 second on) flash or flashes, it indicates that a service representative needs to correct the problem. If the flash sequence does not include the long (2 second on) but only a short flash or flashes, this generally indicates that the user can correct the problem by, making sure the "stop switch in the car is in the run position, shutting the car gate, or shutting a hoistway door.

(Q): I press a button to call the car to my floor, the button lights up but the car does not move, after some time the light in the button turns off and then flashes on once. If I press the button again, the light does not stay on but again flashes on once. Why won't my unit run?

(A): The first time you pressed the button, the call to your floor was being held, waiting for either the car gate or a hoistway door to be closed. The car gate or hoistway door was not closed within the time period set in the parameter field, and the call was then dropped. The single flash of the button light indicates that the car gate circuit is in an open position and needs to be closed in order to allow a run. Check the "Stop" button and make sure it is in the run position and also make sure the gate is closed.

#### A. Call button flashes, continued

(Q): I press a button to call the car to my floor, the button lights up but the car does not move, after some time the light in the button turns off and then flashes twice. If I press the button again, the light does not stay on but again flashes twice. Why won't my unit run?

(A): The first time you pressed the button, the call to your floor was being held, waiting for either the car gate or a hoistway door to be closed. The car gate or hoistway door was not closed within the time period set in the parameter field, and the call was then dropped. If the two flashes on the button light were short (1/2 second on each), this indicates that the hoistway door is in an open position and needs to be closed in order to allow a run. Make sure all hoistway doors are closed. Note: If the two flashes were one long (2 seconds on) and then one short (1/2 second on), this is not a door open condition and you need to call a service representative.

#### **B. Automatic Car Light**

(Q): My customer wants the car lights to turn off sooner. What can I do?

(A): The time can be changed by the Car Light Timer parameter. Use the P-Tool and access the program section, and then change the setting for the "Car Light Timer".

(Q): My customer says the car light never turn off. They can see the light shining under the door.

(A): The number one cause for this condition is that either the car gate is not closed, or the hoistway door is not closed. The light timer does not function until both the car gate and hoistway doors are closed. One other possible cause would be that the AL relay is not functioning. The control uses the N/C contacts of the relay to power the lights, if the relay is functioning correctly then the light could stay on.

#### C. Miscellaneous

(Q): If we want to add a power gate operator to a unit that was not ordered with one, do we have to buy a new controller or make major modification to the current one?

(A): No, with the 4M2 controls you will not need a new controller nor will there be any major modifications to the existing control. All 4M2 controls have provisions built in for control of two power gate operators and four power door operators. All you need to do is add the power operators, connect the correct wires into the controller and change some parameters (using the P-tool).

(Q): Do I need to put limit switch, pushbutton and interlock wiring in metallic conduit?

(A): Maybe, this would typically be determined by your local building codes. All power supplied to these devices is low voltage (24 VDC). Check with your local authority for determination.

(Q): We had a power loss while trying to go the lower level but the car stopped at the 2nd level.

Do we have to get out at the 2nd level or can we ride the car down to the lower level?

(A): Yes, you may ride the car to a lower level. When main power is lost the car goes into

"Emergency Lowering Mode" and will stop at the next lower floor that it comes to. The car can then be called or sent to a lower level if all the appropriate safety circuits are made.

#### C. Miscellaneous, continued

(Q): I want to use my elevator but how do I tell if the car is at my level or needs to be called to my level?(A): In our opinion, the best thing to do is press the call button before pulling on the door. If the car is at your level, the button light will extinguish when the button is released. If the light stays illuminated, then the car is at another floor. We feel this is the best operation because units that utilize electro-mechanical locks may require the pressing of the button to unlock the door.

#### 7-1 TROUBLE SHOOTING:

FAULT	Possible Cause	Corrective Action Required
MSC open during run	Pit Switch not being used and required jumper was not installed.	Review electrical diagrams and place jumper between required terminals.
	Pit Switch open	Put Pit switch back to "Run" position and then perform controller "Reset" function.
	Top or Bottom Final Limit switch set too close to terminal landing.	Move car off of Final Limit and adjust cam or switch position if necessary, then perform controller "Reset" function.
	Car top Stop switch opened.	Put Stop switch back to "Run" position and then perform controller "Reset" function.
	Car Slack Rope / Safety switch tripped.	Evaluate the condition and location of the car. Use proper safety rules when dealing with this situation and never attempt to get under or onto the car unless the unit has been adequately assessed and the proper safety precautions have been taken. Manually reset the switch and then perform controller "Reset" function.
	Car top mounted Final Limit Sw. (Drum only)	Move car off of Final Limit and adjust switch position if necessary, then perform controller "Reset" function.
GC open during run	In-car stop switch in "Stop" position	Put stop switch to "Run" position.
	Car gate opened during run.	Close car gate.
HDC open during run	Hoistway door contacts opened while coming into or through a floor during run.	Check adjustment of door closer, spring hinges, or latch, to insure proper closing pressure and adjust if necessary.
	Door "Lock" and "Closed" contacts wired in reverse.	Check wiring and correct if necessary. For GAL interlocks, the lower contacts are the "Door Closed" contacts.
<b>HDL open during run</b> (General)	Door lock not locking	Check for binding between keeper and locking member and re-align if necessary.
	Door lock not locking	Interlock too far from back of door panel and keeper does not enter lock far enough, inhibiting the locking member from engaging the keeper. Make necessary adjustments.
	Door lock not locking	Door panel warped and does not allow keeper to extend into the lock far enough. Make necessary adjustments.
	Door locking but no HDL signal to controller.	Check wiring and correct if necessary.
	Door "Lock" and "Closed" contacts wired in reverse.	Check wiring and correct if necessary. For GAL interlocks, the lower contacts are the "Door Closed" contacts.
	If using Electro-Mechanical locks, HDC to HDL jumper missing.	Refer to electrical drawing and verify that required jumper is installed.

#### 7-1 TROUBLE SHOOTING, continued:

HDL open during run when leaving or passing by a floor & car does not return to floor level	Position Magnet too long. DZ signal is lost before car comes to rest after losing Position signal.	Shorten Position magnet 1/8 to 1/4 inch until car returns to floor after fault.
<b>Overload Trip</b> Only Single Speed drum units include a manually resettable overload. Overloads on VF Drum and Hydraulic units automatically reset after thermal cool down.	Motor incorrectly wired	Check wiring and correct if necessary then perform controller "Reset" function.
	Line Voltage too low	Measure voltage and if more than 10% below nominal, contact Power Company for correction.
	Unit run with over capacity loading	Reset or allow overload to cool down and then perform controller "Reset" function.
	Incorrect wire size used for power source	Typical wire gauge should be minimum of 10. If longer than normal lengths, from power source to controller, disconnect are required, wire guage may need to be increased.
	Incorrect wire size used to connect motor	Typical wire gauge should be minimum of 12. If longer than normal lengths from controller to motor are necessary, increase wire size to 10 ga.

#### 8) MAINTENANCE:

This section is intended to be part of your Maintenance Control Program (MCR).

Any person performing maintenance on the 4M2 controller must comply with the \*\*WARNING\*\* located inside the cover of this manual.

- 1. Controller & Car Top Box:
  - a. Verify that all cables are secured to their enclosures.
  - b. Verify that the interior of the enclosures are free from debris.
- 2. Electrical Disconnect:
  - a. Verify that the correct (type  $\vartheta$  size) fuses are installed.
- 3. Document then Clear LOG
- 4. Document then Clear Counters
- 5. Verify Safety Circuit Operation:

This process will confirm that all safety circuits function as expected. The critical LED(s) to observe are RED and located on the left side of the logic board. These LEDs have the following designators: UT, LT, MSC, GC, HDC, HDL and LPS

a. Cycle each of the following applicable switches and confirm that ALL critical LEDs turn

OFF when the switch is opened and back ON when the switch is closed: Pit Switch,

Upper Final Limit, Lower Final Limit, Slack Rope Switch and Car Top Stop

Note: To perform this test the gate must be closed and the hoistway doors must be closed and locked.

- b. Manually unlock a hoistway door. Result: HDL goes OFF.
- c. Open a hoistway door. Result HDC goes OFF and HDL remains OFF.

## **SECTION 11: EMI CONTROLLER MANUAL**

#### 8) MAINTENANCE, continued:

d. Open the gate. Result GC goes OFF; HDC and HDL remain OFF.e. Close the gate. Result GC turns ON; HDC and HDL remain OFF.f. Open "IN CAR STOP". Result GC goes OFF; HDC and HDL remain OFF.Note: Repeat test "b" and "c" for each hoistway door.

- 6. Terminal Limits (Hydro):
- a. With the car at the upper terminal floor:
- i. Initiate "TEMP MODE".
- ii. Run the car above the floor
- 1. Verify that the car stops before the stop ring is contacted
- b. With the car at the lower terminal floor:
- i. Open the manual lowering valve
- 1. Verify that the car stops before LPS goes off
- 7. Emergency Lowering:

To perform this test a jumper must be placed between terminals SW1 and SW2.

- a. While the car is running UP in response to a call, turn OFF the main disconnect
- i. The car should stop and run down to the next landing.
- ii. The car should respond to calls from lower landings.
- iii. The emergency light will remain illuminated for 30 sec after the car reaches the lower terminal floor.
- b. Remove jumper from SW1 and SW2.





















Phone: 800.526.0026 Fax: 954.917.7337

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