LS-EDGE Positioning System

The LS-EDGE positioning system uses hall-effect sensors and perforated steel tape to report position as the car moves through the hoistway. 5.5-inch magnets are used at each door zone; one row for front openings, a second for rear openings. LS-EDGE is also available in a NEMA 4x/12 configuration that uses stainless steel hoistway materials and a sealed sensor head.

The system uses capacitor-stored power and non-volatile memory to retain position information in the event of a power failure, continuing to capture information for 10 seconds after power loss and storing the final reading for use after power restoration. The LS-EDGE system may be used with MCE iControl, Motion, or Element elevator controls.

The LS-EDGE kit contains the sensor head assembly, an “L” bracket to mount the sensor assembly to a uni-strut that is in turn attached to the elevator cab (uni-strut to elevator cab not provided), steel tape, top and bottom steel tape hanger assemblies, the required number of door zone magnets, and the CAT-5 electrical cables required to connect the sensor to the interface board.

Depending on applicable code, you may have to route electrical connections through conduit. If so, we recommend minimum 3/4-inch flex so that the modular connectors can slide through without binding. Perforations for cable tie wrap connection are provided on the RJ-45 plug-end of the sensor head.

Important Software Requirements

When shipped as the original landing system with a new MCE controller, LS-EDGE has the correct software installed and is ready for use.

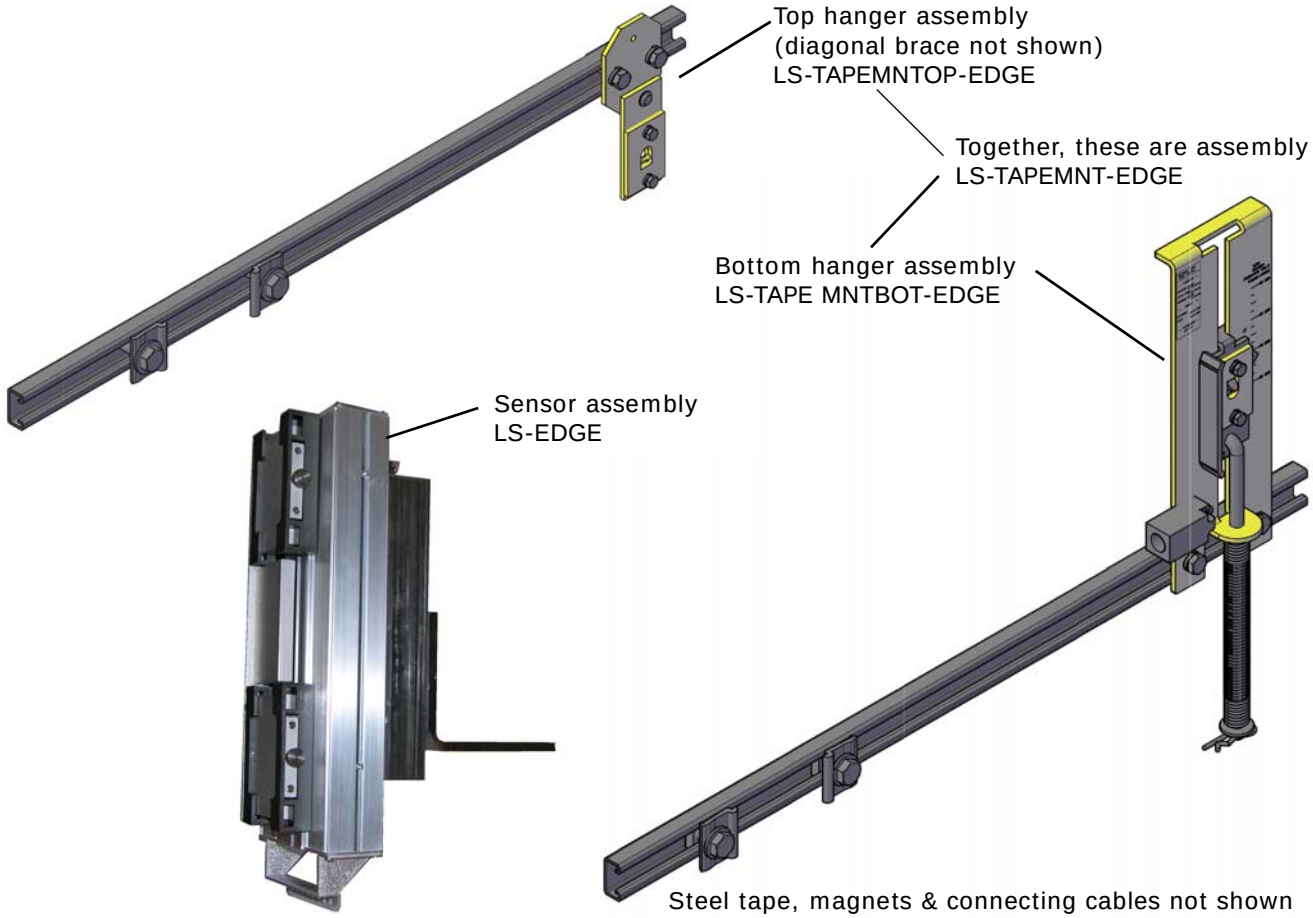
When shipped as a replacement for a damaged unit, you will need to update LS-EDGE to the system/revision level software you are using.

- Install
- Update LS-EDGE software
- Adjust

Please refer to “Updating Software” on page 22.

In This Instruction:

Figure 1. LS-EDGE Components



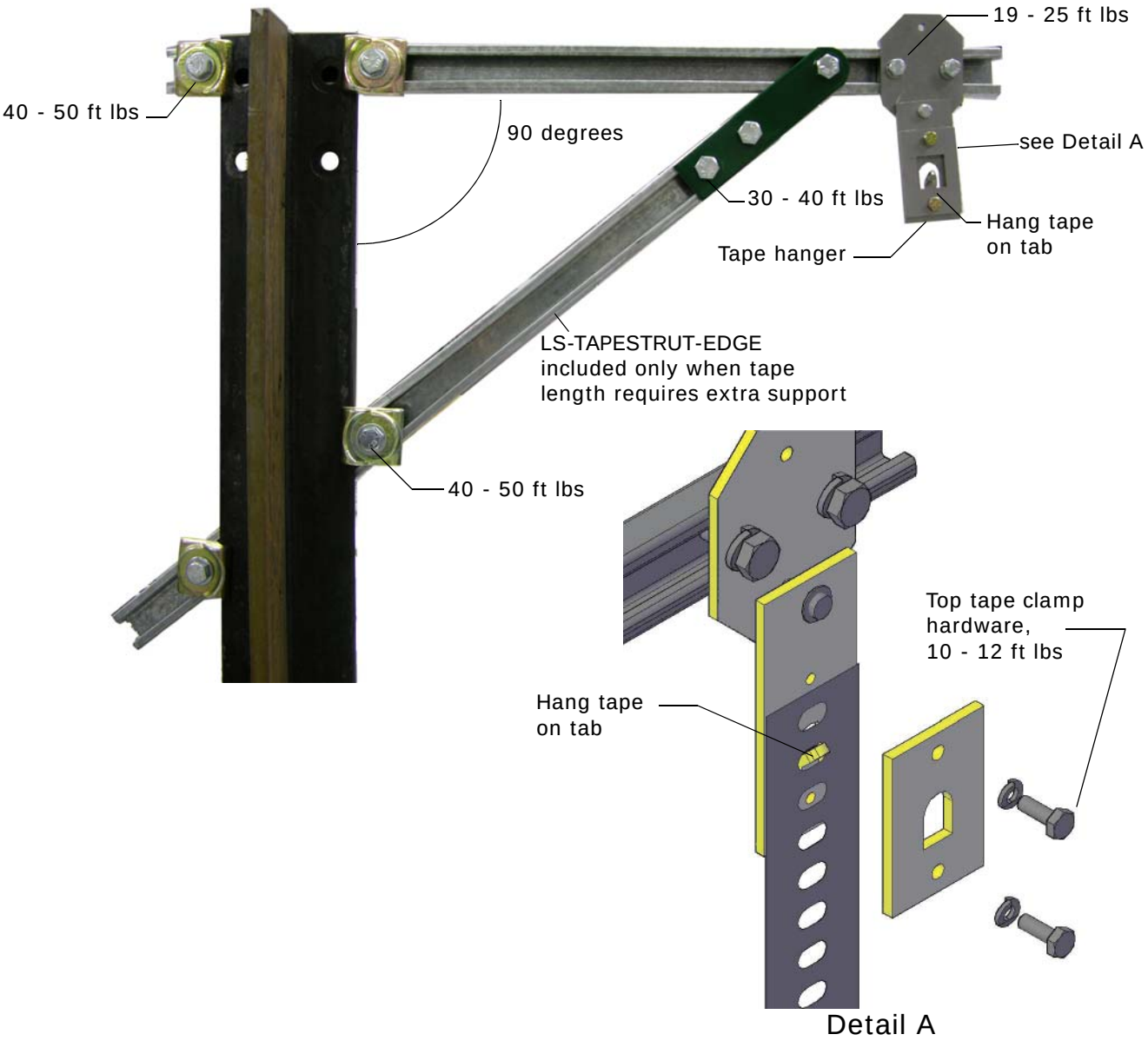
Tape Installation

Before installing perforated tape, ensure adequate clearance from beams, walls, counterweight, cab, and terminal limit devices. Make sure the sensor is not placed so close to the governor lift arm that, when the car safeties are activated, the sensor is damaged or the car safeties cannot apply.

- Hang the tape high enough in the hoistway so that, when the counterweight is on a fully compressed buffer, the sensor assembly will not be damaged by overhead obstructions. Uni-struts are provided to attach the tape to the rails.
- Attach the tape in the pit low enough so that, when the car is on fully compressed buffer, the sensor assembly does not contact the bottom hanger assembly.
- Adjust tape spring tension so the tape does not make noise as the car travels up.
- During installation, the edges of the tape sometimes become gouged. After the tape is installed, use a fine file on the edges of the tape to remove any burrs or gouges. This will lead to much quieter operation of the encoder system as the car travels at contract speed.
- After smoothing the edges, wipe off all excess oil and dirt from the face of the tape before installing magnets. Do not use rags that will leave lint on the tape.

Top Hanger Assembly

1. Attach the uni-strut for the top tape hanger across the back of the selected guide rail using the forged rail clips and hardware provided.
2. Attach the diagonal brace as shown below. (Used only when tape length exceeds 150 feet.)

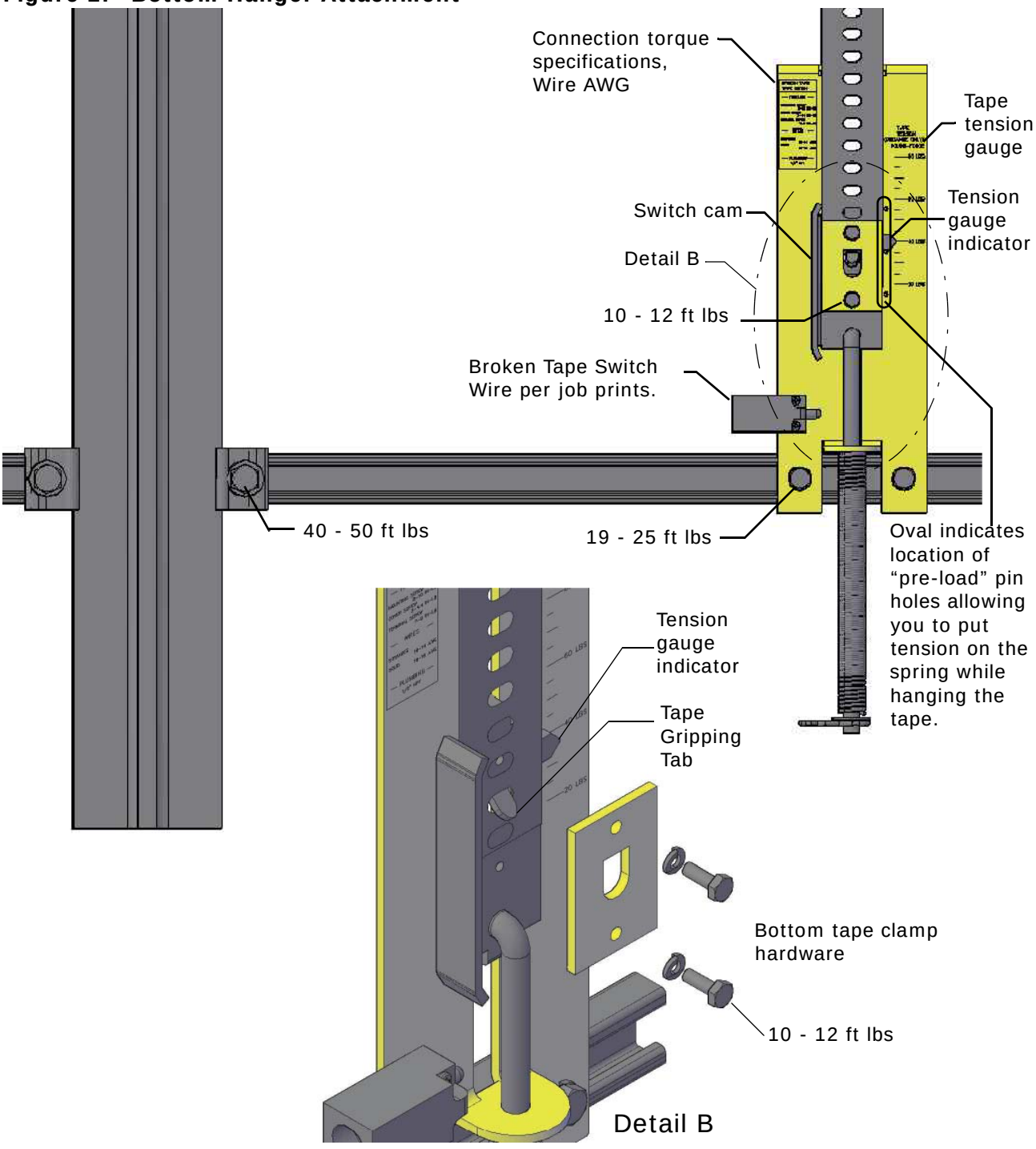


3. Adjust extended strut length as required (tape suspended as close to the guide rail as adequate clearances will allow to reduce loading on end of unistrut). Secure rail mounting hardware (40 - 50 ft lbs.). (The tape hanger slides in the strut for fine adjustment later.)
4. Hook the tape on the protruding tab. Secure the top tape clamp in place (10 - 12 ft lbs.).
5. Record the distance from the rail edge to the tape edge. _____ in/mm.

Bottom Hanger Assembly

The bottom hanger provides tension to minimize vibration while allowing expansion/contraction across seasonal temperature ranges. Ensure that the tape to rail edge measurement matches that recorded for the top hanger so that the car tracks the tape accurately. Do not use a plumb in case the rail stack is not exactly aligned. The scale values are provided as a guideline only. They are not calibrated. Adjust to suit the installation.

Figure 2. Bottom Hanger Attachment



Broken Tape Switch

The normally closed contacts on the Broken Tape Switch are used to detect a broken tape condition. The switch is mounted backwards for protection during shipment. Remove it and mount it as shown on page 4. Position the switch so that the cam on the tensioner activates (opens) the switch when the tensioner is at the bottom of its travel (no tension). Note that switch position should be adjusted so that the switch is activated by the cam but not so close that the switch is held against its mechanical stops. The switch activates at approximately 50% of travel.

Hanging the Tape

Work from the cartop to hang the tape from the top hanger and allow it to unroll slowly as you move the car down the hoistway. It is best to allow the tape to hang and straighten for at least 24-hours before attaching it to the bottom hanger.

Tape Tension

The tape is tensioned according to compression of the bottom tape mount spring. The tension gauge provides visual indication of low, medium, and high tension positions. Short runs, up to five floors will generally be acceptable at the low tension position. Runs to 15 floors will generally be acceptable at the medium tension position. Longer runs may require the high tension position but you should start out with the medium setting first.

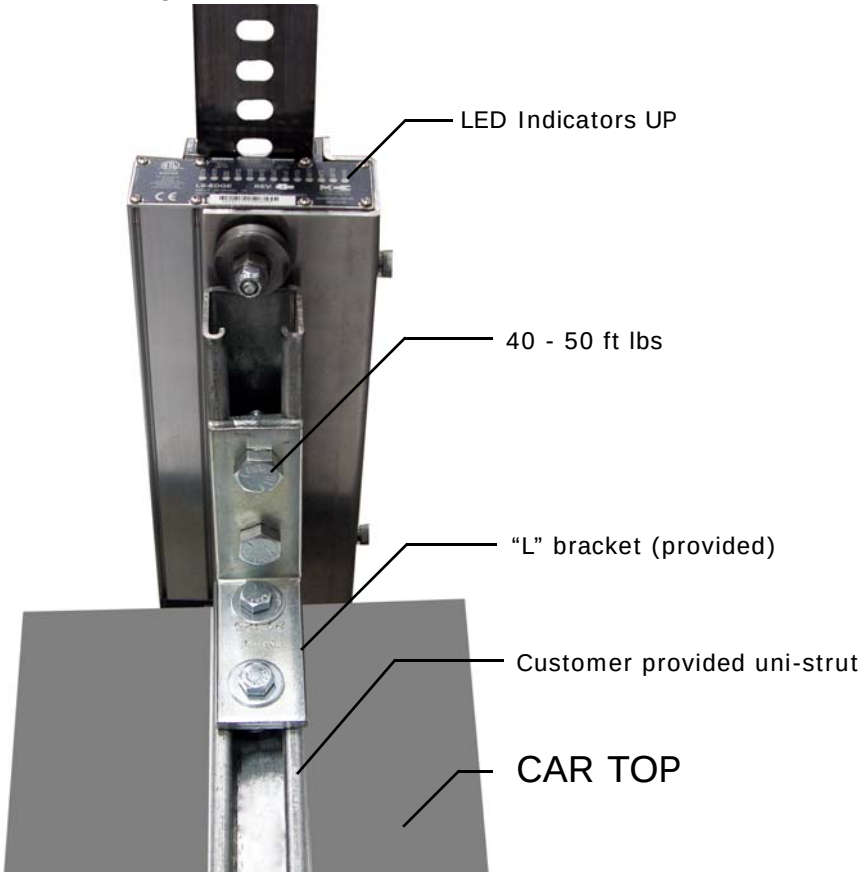
Tape tension is intended to reduce noise caused by tape vibration at contract speed. Generally, you want to use the lowest tension setting that maintains a quiet tape at contract speed.

Sensor Installation

Tape guide side pieces easily detach so the sensor can be slipped onto the steel tape.

Figure 3. Sensor with Guide Sides Removed

Figure 4. Sensor Mounting



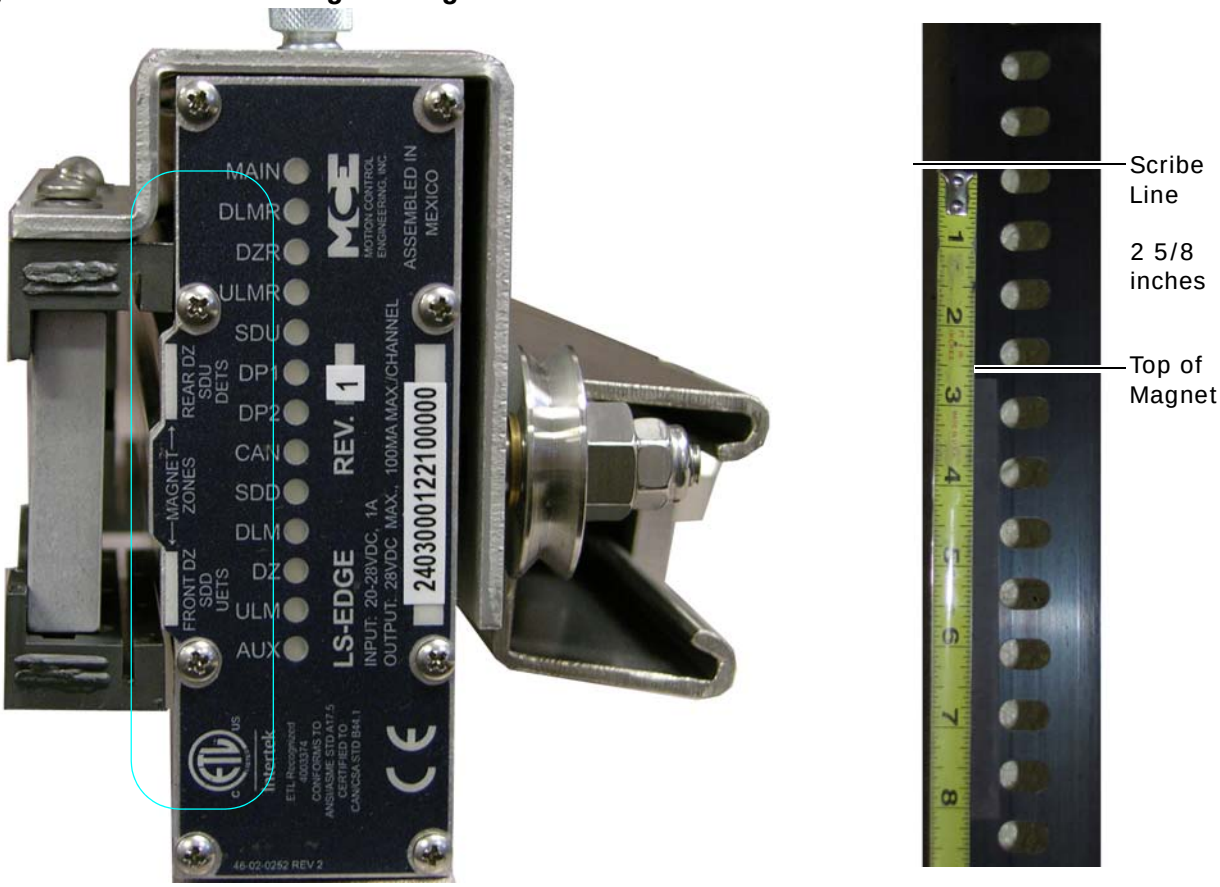
Sensor Alignment

After the tape has been installed, check the sensor alignment. The sensor should not ride hard on either side of the uni-strut bracket during any part of travel through the hoistway. In high-rise buildings, if rail alignment varies substantially, it may cause the encoder guides to wear prematurely. If such misalignment is noted, the installation should be inspected more regularly.

Door Zone Magnets

5.5-inch strip magnets are used at each floor/opening position. Front and rear magnet alignment is shown on the sensor top label. Looking at the perforated tape from the elevator car, the magnets for the front door zone are mounted to the left of the holes; magnets for the rear door zone are mounted to the right of the holes.

Figure 5. Door Zone Magnet Alignment



Caution

The magnets must be installed so that they face the front cover of the sensor assembly as indicated by the diagram on the LED indicator label.

To mount the door zone magnets:

1. Move the elevator level to the highest floor on inspection.
2. Make a mark on the tape even with the top of the sensor assembly. Lower the car one foot.
3. Place the top of the door zone magnet 2 5/8 inches below the scribe mark and to the left (front door) or right (rear door) of the holes. For now, simply place the magnets. You can secure them permanently after final adjustments.
4. Continue mounting door zone magnets as described above for successive floors. Maximum floor height is 40.0 feet.

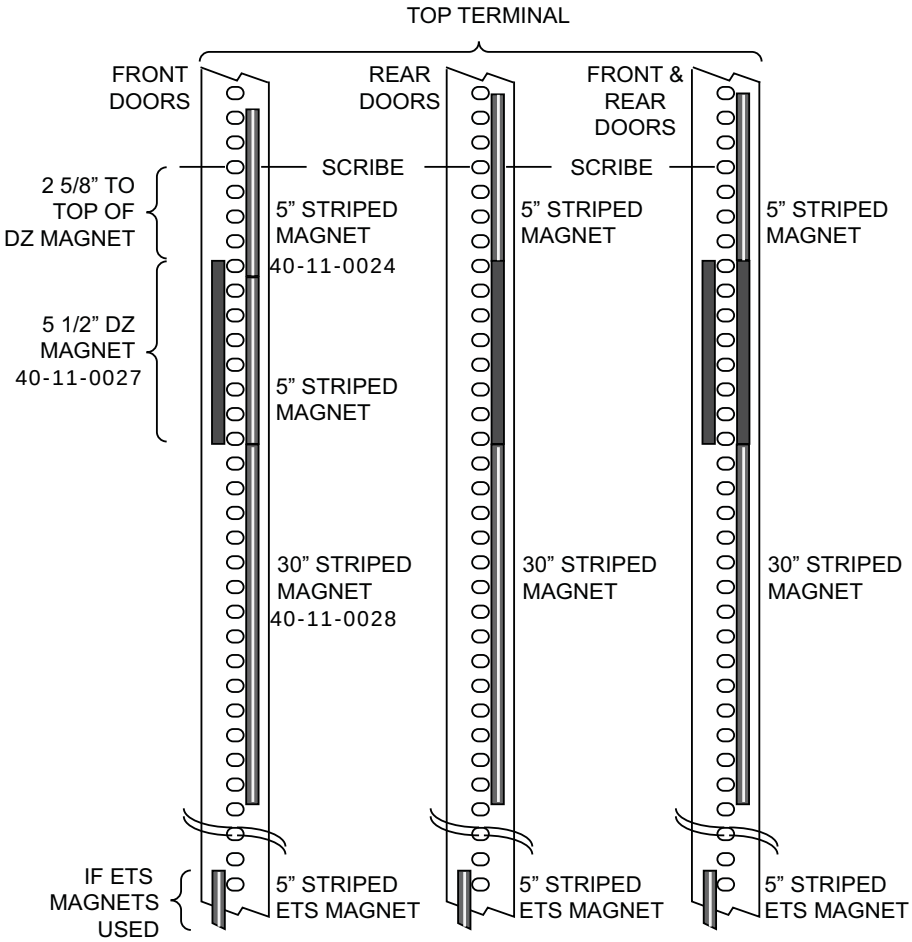
Terminal Magnets

iControl does not use terminal magnets; cam-operated switches are used for the normal and final limits. For Motion and Element installations, special striped magnets are used to designate the top and bottom terminals and for ETS if used. Please refer to the following instructions that are appropriate for the type of controller being installed.

Motion 4000/Element Traction Top Terminal & ETS Magnets

Striped magnets are used at the top and bottom terminals for Motion 4000 and Element traction installations. Element uses only front door magnets. Five inch striped magnets are also used for physical ETS when required. If reduced stroke buffers are used, cam operated ETSL switches may also be required.

Figure 6. Motion 4000 and Element Traction Top Terminal and ETS Magnets

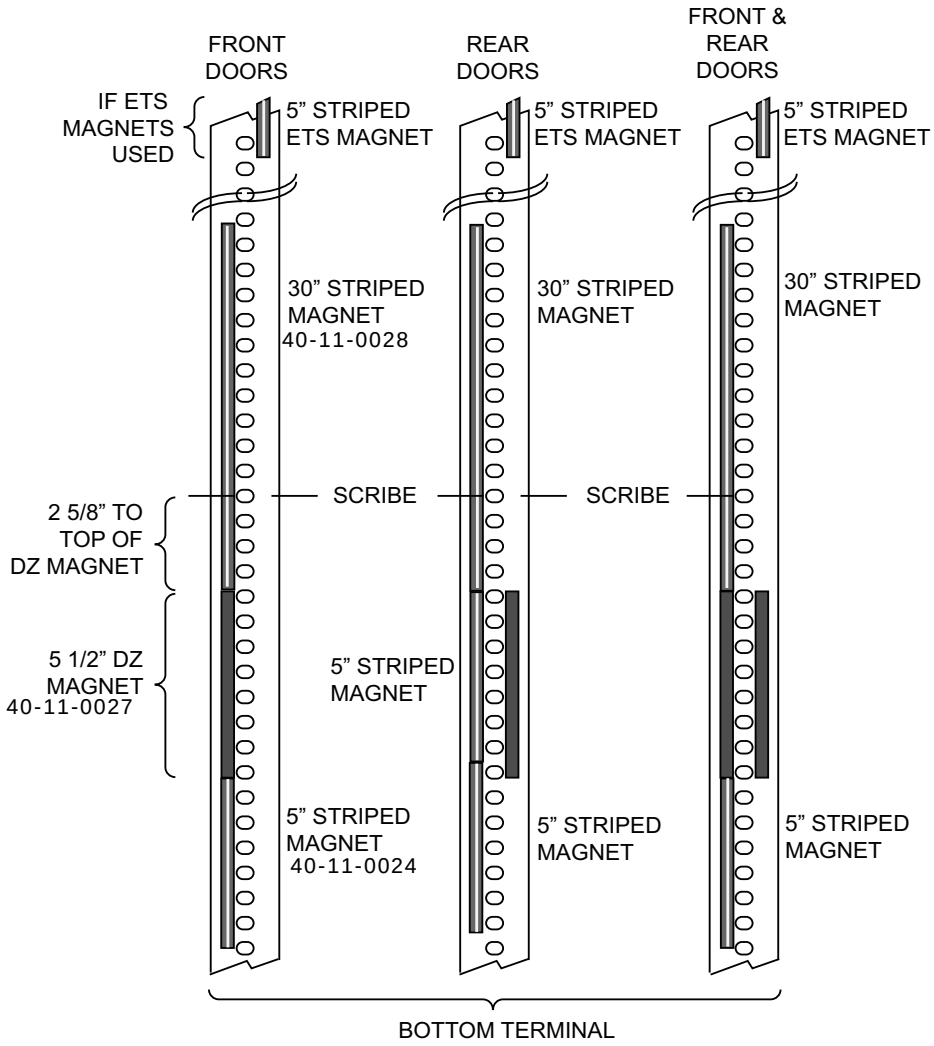


1. Place a 30-inch, striped magnet on the tape to the right of the holes, just below the top door zone magnet as shown above. The top of the 30-inch magnet must be even with the bottom of the door zone magnet.
2. For jobs with front doors only stack two 5-inch striped magnets above the 30-inch magnet. Leave NO GAPS between the striped magnets.
3. For jobs with rear or front and rear doors, stack one 5-inch striped magnet directly above the Rear Door Zone magnet. Leave no gaps between the ends of the magnets.
4. For ETS magnet location for Motion 4000 see Motion 4000 Slowdown Learn, ETS Placement on page 14. For ETS information for Element Traction controls, refer to "Terminal Switch Configuration" in the Element Traction User Guide.

Motion 4000/Element Traction Bottom Terminal & ETS Magnets

Striped magnets are used at the top and bottom terminals for Motion 4000 and Element traction installations. Element uses only front door magnets. Five inch striped magnets are also used for physical ETS when required. If reduced stroke buffers are used, cam operated ETSL switches may also be required.

Figure 7. Motion 4000 and Element Traction Bottom Terminal and ETS Magnets

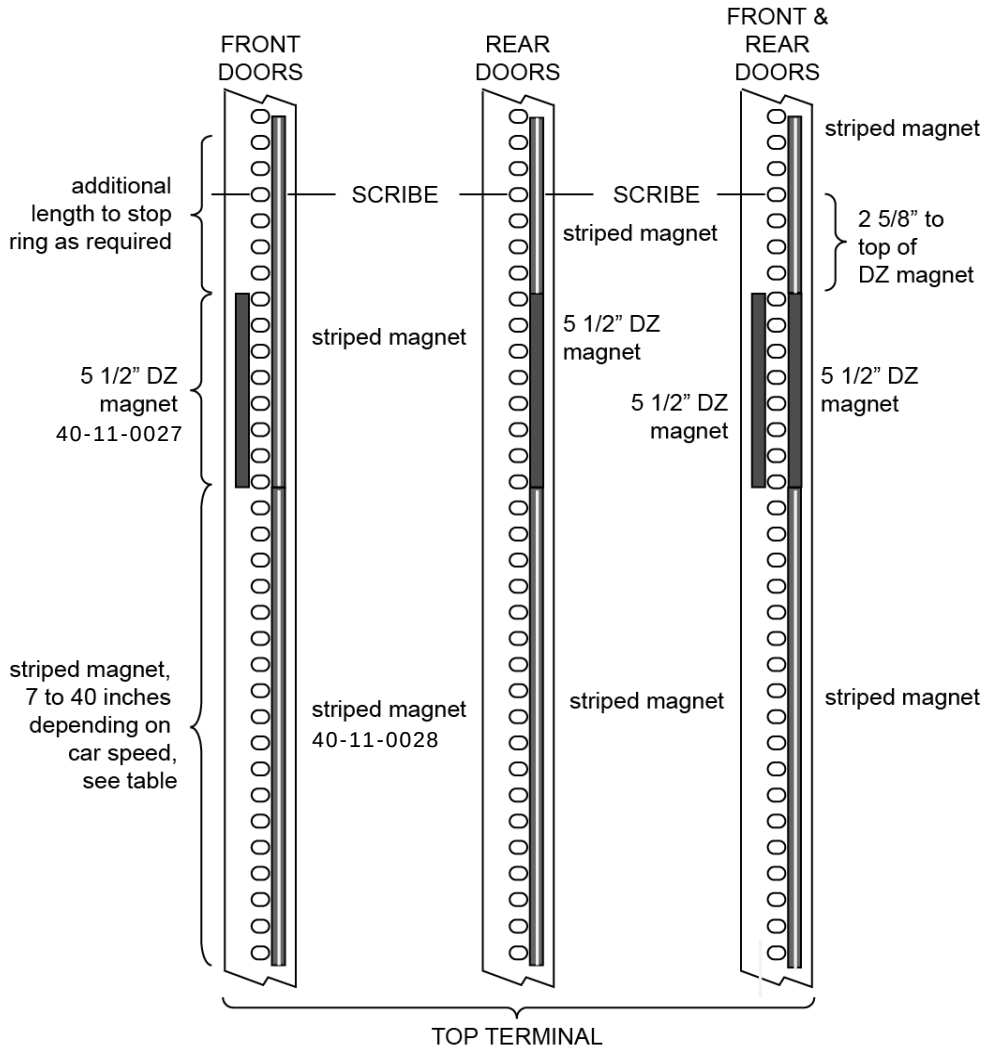


1. Place a 30-inch, striped magnet on the tape to the left of the holes, just above the bottom door zone magnet as shown above. The bottom of the 30-inch magnet must be even with the top of the door zone magnet.
2. For jobs with rear doors only, stack two 5-inch striped magnets below the 30-inch magnet. Leave NO GAPS between the striped magnets.
3. For jobs with front or front and rear doors, stack one 5-inch striped magnet directly below the Front Door Zone magnet. Leave no gaps between the ends of the magnets.
4. For ETS magnet location for Motion 4000 see Motion 4000 Slowdown Learn, ETS Placement on page 14. For ETS information for Element Traction controls, refer to "Terminal Switch Configuration" in the Element Traction User Guide.

Motion 2000/Element Hydro Top / Bottom Terminal Magnets

Striped magnets are used at the top and bottom terminals for Motion 2000 and Element hydro installations. Element uses only front door magnets. The length of the terminal magnets depends upon car speed, the aggressiveness of the slowdown, and the travel distance between level at floor and end of travel.

Figure 8. Motion 2000 / Element Hydro Top Terminal Magnets



1. Refer to Table 1 on page 11 to determine the length of the magnet to be placed below the top terminal DZ magnet to the right of the tape holes (Please refer to "Motion 2000 / Element Hydro Top Terminal Magnets" on page 10).
2. Place magnet(s) to the right of the tape holes, above the top terminal DZ magnet sufficient to allow the car to reach the stop ring while still sensing the magnet.
3. Refer to Table 1 on page 11 to determine the length of the magnet to be placed above the bottom terminal DZ magnet to the left of the tape holes (Please refer to "Motion 2000 / Element Hydro Bottom Terminal Magnets" on page 11).
4. Place magnet(s) to the left of the tape holes, below the bottom terminal DZ magnet, sufficient to allow the car to reach bottom travel limit while still sensing the magnet.

Figure 9. Motion 2000 / Element Hydro Bottom Terminal Magnets

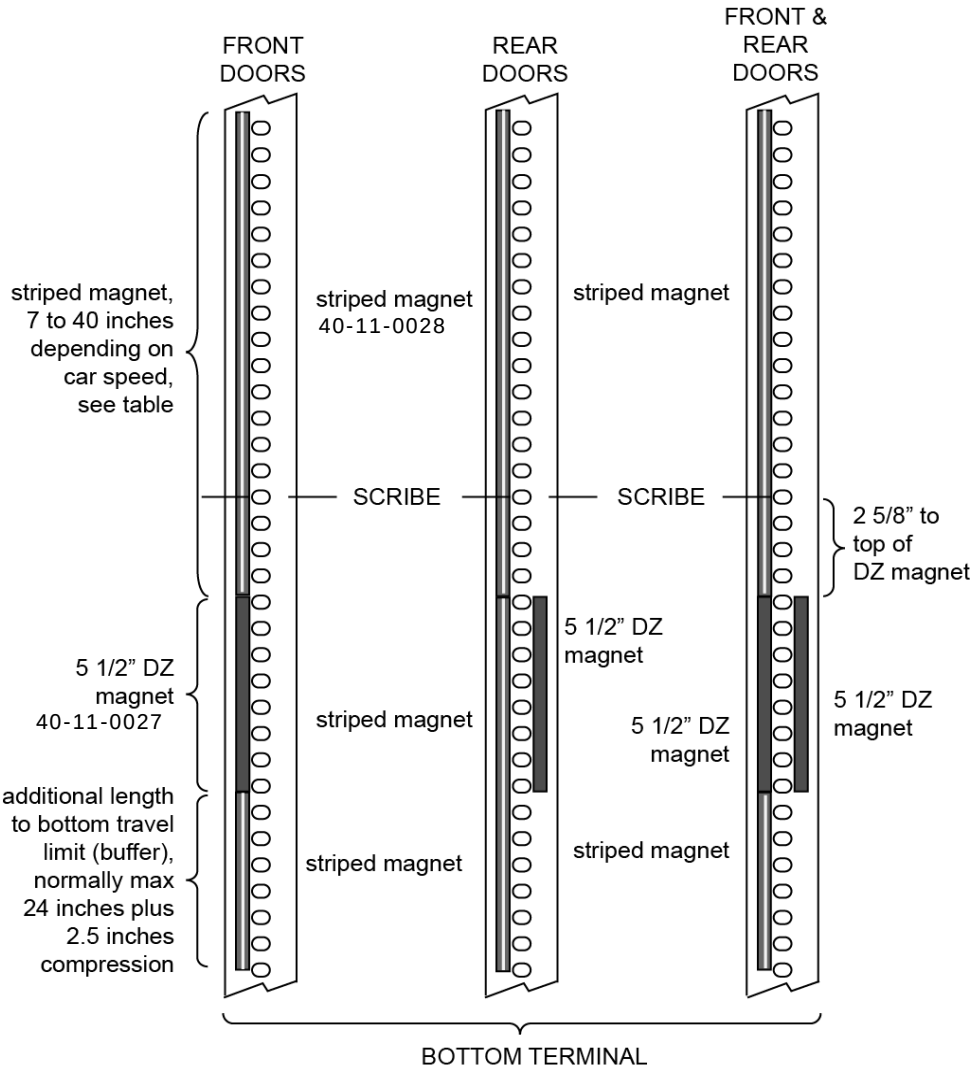


Table 1. Suggested Length of Terminal Magnet Before Leading Edge of DZ Magnet

Car Speed	Length of Terminal Magnet Preceding Floor Zone Magnet	Car Speed	Length of Terminal Magnet Preceding Floor Zone Magnet
Gray area = Element Hydro		110 fpm	19 inches
<65 fpm	7 inches	125 fpm	22 inches
70 fpm	8 inches	140 fpm	25 inches
75 fpm	10 inches	150 fpm	28 inches
80 fpm	11 inches	160 fpm	30 inches
85 fpm	12 inches	170 fpm	32 inches
90 fpm	13 inches	180 fpm	35 inches
95 fpm	14 inches	190 fpm	37 inches
100 fpm	16 inches	200 fpm	40 inches

Motion 2000 / Element Hydro Terminal Magnet Logic

The terminal limits from the LS-EDGE are positional back-up only. The controller uses serial counter data to adjust speed depending on the positions of the virtual limits. The LS-EDGE magnet logic is a redundant means of terminal limits.

Motion 2000 Hydro does not use the DTL and UTL signals from the LS-EDGE Landing system.

- L = LEVELING MAGNET (UNMARKED)
- T = TERMINAL MAGNET PRESENT (STRIPED)
- 0 = NO MAGNET PRESENT
- X = DON'T CARE

When the controller is powered up with no sensors present, **DSL1, DTL, USL1,** and **UTL** are closed.

- **DSL1** is open in the presence of terminal magnets at ULM, DZ, DLM, or SDD sensors.
- **DTL** opens about 3.25" below dead zone of bottom terminal floor

ULM	DZ	DLM	SDD	ULMR	DZR	DLMR	SDU
T	T	T	T	X	X	X	X

- **DTL** closes about 2.25" below dead zone of bottom terminal floor

ULM	DZ	DLM	SDD	ULMR	DZR	DLMR	SDU
0	L/0	L/0	0	X	X	X	X

- **USL1** is open in the presence of terminal magnets at ULMR, DZR, DLMR, or SDU sensors.
- **UTL** opens about 3.25" above dead zone of terminal floor

ULM	DZ	DLM	SDD	ULMR	DZR	DLMR	SDU
X	0	L	X	T	T	T	T

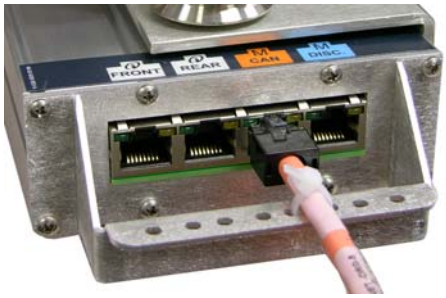
- **UTL** closes about 2.25" above dead zone of top terminal floor

ULM	DZ	DLM	SDD	ULMR	DZR	DLMR	SDU
L	L	X	X	T	T	T	T

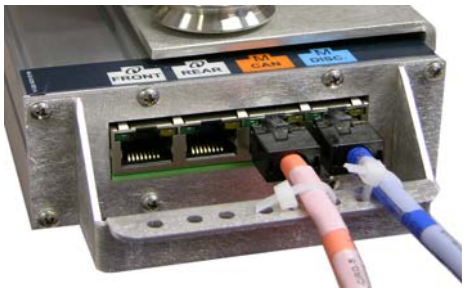
Electrical Connection

Make electrical connections as shown in the job prints. iControl uses separate Front and Rear door zone connections. Motion 4000, v8, uses the M-CAN connection. Element, Motion 2000, and TSSA compliant (v9) Motion 4000 installations use the DISC (discrete) and M-CAN connections. **Caution!** Secure cables with a nylon tie wrap through the holes provided. VERY IMPORTANT as it provides strain relief and prevents connector fatigue over time. Strain relief is built-in to the NEMA 4x/12 version of the sensor.

Figure 10. Sensor Connections



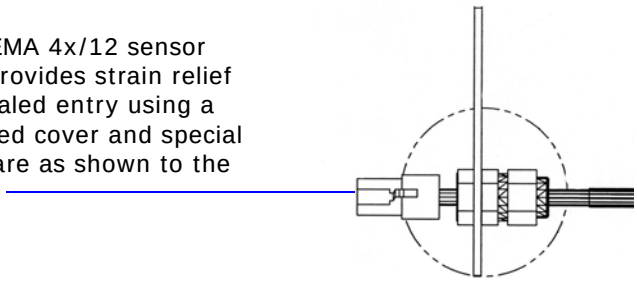
M4000 Standard CAN, single orange cable



Element, M2000, and M4000 TSSA - M-CAN & Discrete, 1 orange and 1 blue cable

iControl, single, gray cable per opening (FRONT/REAR)

The NEMA 4x/12 sensor head provides strain relief and sealed entry using a gasketed cover and special hardware as shown to the right.



Parameter Settings

Verify the following parameters settings per controller.

Motion 4000 Traction

Refer to Section 4 of the Motion 4000 manual: F7, parameter 191 = LS-EDGE.

Motion 2000 Hydro

Refer to Section 5 of the Motion 2000 manual: Set F7, parameter 191 to LS-EDGE.
F7 parameters 209 + Step Dn“x” and 210 + Step Up“x” = Factory settings (x = floor #)
F7 parameters 241+ Sub Step Dn“x” and 242+ Sub Step Up“x” = Factory settings
F1 Program Mode - Additional Car Options Menu - LS-EDGE Landing System? = Yes.

Element

Config 01, Building Setup information is correct.
Config 02, Hoistway Setup menu is correct per factory settings.

iControl

Controller View > Configuration > Pattern - Position encoder resolution = 256 pulses/ft.

Hoistway Learn

Offset

All compatible controllers allow the door zone heights to be individually adjusted in 0.10 inch increments to compensate for magnet placement irregularity. Please refer to the manual for the controller used.

Motion 4000

1. Place the car on Inspection operation.
2. Move the car to the bottom terminal.
3. Set the F6 function switch in the UP/ON position.
4. The LCD will display HOISTWAY LEARN, PRESS S.
5. Press S to initiate learn.
6. Place car on TEST mode. Shut off INSPECTION. Follow instructions on the LCD.

Motion 4000 Synopsis As you follow the instructions on the LCD, the car will first travel down to the bottom terminal at Correction speed then move up to locate the center of the door zone magnet. From the bottom terminal, the car will move up the hoistway finding each door zone and indicating the height in inches of each door zone magnet center (Front and/or Rear as appropriate). Upon reaching the top terminal, the LCD will report hoistway information stored and offer the option to press N if you are Done or S if you want to restart the learn operation. If a number of floors mismatch message appears, the number of floors does not match the number of door zone magnets and the problem must be corrected before learning.

7. Press N when hoistway learn reports complete to exit the operation.
8. Place F6 in the Down position.

Once the door zones have been learned, you are ready to learn terminal and emergency slowdown positions, Please refer to “Motion 4000 Slowdown Learn, ETS Placement” on page 14.

Motion 4000 Offset Motion 4000 allow the door zone heights to be individually adjusted in 0.10 inch increments to compensate for magnet placement irregularity up to a maximum +/- 0.9 inches for LS-EDGE.

Motion 4000 Slowdown Learn, ETS Placement

This operation determines locations for slowdown and emergency switches for the job and, if ETS magnets are used, automatically assists you in placing them.

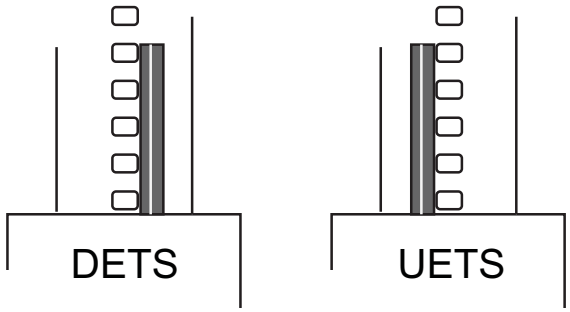
1. Reference your job prints and activate the switches used on your job.
2. Move the car to the bottom terminal on Test mode.
3. Set the F5 function switch in the UP/ON position.
4. Move to the Terminal Limit Utilities menu and press S to select.
5. The LCD will display PERFORM UXTS AND DXTS LEARN. Press S to Select.
6. The LCD will display TERMINAL LEARN/S: START. Press S to begin.
7. The LCD will ask you to enter switch tripping thresholds for the ETS switches (if used), then for the NTS switches used on the job.
   - Press S to move the cursor to a digit position.

- Use +/- buttons to increment/decrement values.
- Typical ETS setting is 80% (of contract speed). Press N to move on.
- NTS settings depend on switch position:
  - Outermost NTS: 90% (of contract speed). Press N to move to next NTS switch.
  - Next NTS in: 70%. Then 60%, 50%, 40%, for additional switches moving toward the terminal.

8. After the last NTS switch is set, the LCD will cue you to press S to store the values.
9. After switch thresholds are stored, the LCD will display LEARN READY/S= LEARN UXTS. Press S to initiate.

The car will move up the hoistway, reporting each switch as its position and speed are learned. At the top of the terminal, the LCD will display:

10. UXTS LEARNED/S= LEARN DXTS. Press S to initiate.
11. The car will move down the hoistway, repeating the learn for the bottom terminal. It will stop at the bottom floor and report SAVING SWITCHES, PLEASE WAIT followed by TERMINAL DONE/S=EXIT. Press S to exit the learn.
12. LS-EDGE only. If you have ETS on the job, press N until the LCD displays ETS POSITIONS LOCATOR. Press S to select.
13. The LCD displays ETS POSITIONS LOCATOR/OFF. Press S to turn the LOCATOR ON.
14. Place the car on Cartop Inspection.
15. Run the car up the hoistway. When it reaches the learned location for the DETS, it will stop. Release the inspection switches.
16. Place the 5”, striped DETS magnet on the tape immediately above the sensor head and just to the RIGHT of the tape perforations. See below.



17. Continue to run the car up the hoistway. When it reaches the learned location for the UETS, it will stop. Release the inspection switches.
18. Place the 5”, striped UETS magnet on the tape immediately above the sensor head and just to the LEFT of the tape perforations. See above.
19. Set the ETS POSITIONS LOCATOR to OFF. Place the F5 switch down.

Motion 4000 Position Adjustments The learn operations described above automatically store switch and speed related information in F7 menu parameter range 1 - 132. Through these parameters, you can display stored values and also make adjustments to the values. Normally, very little or no adjustment is necessary.

Diagnostics, Motion 4000 Extensive diagnostics are available through the Motion 4000 interface to the LS-EDGE. Please refer to the Motion 4000 manual.

Element Traction / Hydro Learn Procedure

After installing the leveling and terminal magnets and, for the hydro, setting step up/step down distances, you will need to perform a hoistway learn operation to learn floor positions. If floor level magnets have been positioned accurately enough, any offset can be adjusted in software (+/- 1 inch).

1. Place car on Test and Machine Room Inspection using switches on SCE-CPU.
2. Set the FLT BYPASS jumper in the BYPASS position.
3. Select the UTILS menu. Select CONSTRUCT AND BYPASS FAULTS.
4. Select CONSTRUCTION/FAULT BYPASS DISABLED; press OK to ENABLE. Press EXIT. Faults are now bypassed.
5. Move car on inspection to about six (6) or more inches above bottom terminal landing.
6. Select CONSTRUCT AND BYPASS FAULTS. Press CONSTRUCTION/ FAULT BYPASS ENABLED. Press OK to disable fault bypass.
7. Move the FAULT BYPASS jumper to the NORM position. Faults are no longer bypassed.
8. Select LANDING SYSTEM UTILITIES. Select HOISTWAY LEARN (LANDING SYSTEM LEARN). Press LEARN.
9. Set Machine Room Inspection switch to NORM. The screen will display FINDING BOTTOM, followed by BOTTOM FOUND. The car will then begin to run up the hoistway.

During the run, the screen will display LEARNING. Once the top floor is learned the screen will display FINALIZING, followed by STORING HOISTWAY, and finally DONE STORING HOISTWAY.

10. Press DONE. Press EXIT. Press EXIT on the following screens until the UTILS home menu appears

Construction Learn

The hoistway can be learned while on Construction using the MACHINE ROOM INSPECTION switches if a problem is encountered using the “normal” learn procedure. When you select LEARN, you are directed to move the car down to the bottom landing. Use the DN + ENABLE switches. A message indicates when the bottom landing position is found. You are then instructed to move the car up the hoistway and indicates as each landing is learned. Release UP + ENABLE when CAR REACHED TOP is displayed. STORING HOISTWAY and finally DONE STORING HOISTWAY are displayed.

Element Traction Elevator Adjustment

The section in the Element Traction User Guide titled *Traction Elevator Adjustment* provides instructions on how to adjust the controller and drive parameters for best performance.

Element Hydro Adjustment

Perform a series of runs to various floors while observing the UTILS, Landing System View display to see that the car is stepping and leveling into each floor appropriately.

Initial Stepping Positions The initial settings for the run up and run down stepping positions were set at the factory using the following table (Grey area applicable to Element). When running up to a floor, the floors step up position forces the elevator to drop high speed. When running down to a floor, the floors step down position performs the same function. If this is a terminal floor, either the step up/down position, the physical position of U/DSL1 switch, or the U/DSL2 position will force high speed to drop.These settings can be verified or adjusted through the CONFIG 02, Hoistway Setup menu.

Table 2. Hydro Initial Stepping Distances

Car Speed	Factory Set Stepping Distance From Floor Level	Car Speed	Factory Set Stepping Distance From Floor Level
Gray area = Element Hydro		85 fpm	20 inches
<35 fpm	8 inches	90 fpm	21 inches
40 fpm	9 inches	95 fpm	22 inches
45 fpm	10 inches	100 fpm	24 inches
50 fpm	12 inches	110 fpm	27 inches
55 fpm	13 inches	125 fpm	30 inches
60 fpm	14 inches	140 fpm	33 inches
65 fpm	15 inches	150 fpm	36 inches
70 fpm	16 inches	160 fpm	38 inches
75 fpm	18 inches	175 fpm	42 inches
80 fpm	19 inches	200 fpm	48 inches

With valves adjusted for speeds and slowdown characteristics desired, adjust floor height and stepping offsets (CONFIG 02, Hoistway Setup) until the car levels properly at each floor without releveling.

Dead Zone (releveling limits) may be adjusted through CONFIG 02, System Control Parameters, Dead Zone Distance if required.

USL1, DSL1 The positions of the physical slow down (USL1/DSL1) switches are determined by the length of the terminal magnets. The leading edge of each terminal magnet is the slowdown position. If high speed has not already been dropped, encountering the slow down will force it to drop. Aggressive slow down settings may require that the terminal magnets be trimmed a little shorter than the factory recommended lengths. The length should be about seven inches less than the associated terminal floor stepping distance or no more than nine inches less than this distance.

USL2, DSL2 The position of the virtual slow down (USL2/DSL2) switches are determined by their user programmed distance (CONFIG o2 > NTS2 SWITCHES). If high speed has not already been dropped, encountering the slow down will force it to drop. This distance should be the same as the associated terminal floor stepping distance or no more than two inches less than this distance.

UTL, DTL UTL and DTL switches are automatically set to 3.25 inches beyond floor level at each terminal (see See “Motion 2000 / Element Hydro Terminal Magnet Logic” on page 12.). If a terminal limit is encountered, the car will move no further in that direction.

You can also adjust the position of the virtual terminal limits by first enabling them (CONFIG 02 > HOISTWAY SETUP > U/DTL LIMIT OPT > VIRTUAL), and then setting their position (U/DTL DISTANCE). This is especially useful for short distances in the pit and/or overhead.

Landing System Troubleshooting Tools

Touch screen tools will help you isolate any problems with the landing system;

- SYSTEM DIAG/LANDING SYSTEM
- STATUS INFO/ADDRESS DIAGNOSTICS/LS-EDGE SPA and LS-EDGE SPB

Address Diagnostics will require register address assistance from MCE.

Motion 2000 Hydro Learn Operation

After installing the leveling and terminal magnets and setting step up/step down distances, you will need to perform a learn operation to learn floor and "switch" positions. If floor level magnets have not been positioned accurately enough, any offset can be adjusted in software (+/- 1 inch).

1. Place the car on Inspection operation.
2. Move the car to the bottom terminal.
3. Set the F6 function switch in the UP/ON position.
4. The LCD will display HOISTWAY LEARN, PRESS S.
5. Press S to initiate learn.
6. Place car on TEST mode. Shut off INSPECTION. Follow instructions on the LCD.

Synopsis As you follow the instructions on the LCD, the car will first travel down to the bottom terminal then move up to locate the center of the door zone magnet. From the bottom terminal, the car will move up the hoistway finding each door zone and indicating the height in inches of each door zone magnet center (Front and/or Rear as appropriate). Upon reaching the top terminal, the LCD will report hoistway information stored and offer the option to press N if you are Done or S if you want to restart the learn operation.

7. Press N when hoistway learn reports complete to exit the operation.
8. Place F6 in the Down position.

Adjusting Floor Heights

Motion 2000 allows the door zone heights to be individually adjusted in 0.10 inch increments to compensate for magnet placement irregularity up to a maximum +/- 0.9 inches. Stored floor heights may be accessed through the F7 menu (first 32 parameters) and the height of each floor individually adjusted at any time.

1. Place the car on Inspection, enter the F7 menu (F7 up, all other switches down).
2. Press N to advance to the desired parameter.
3. Use "+" or "-" buttons to adjust the height of the floor.
4. Place F7 in the down position.

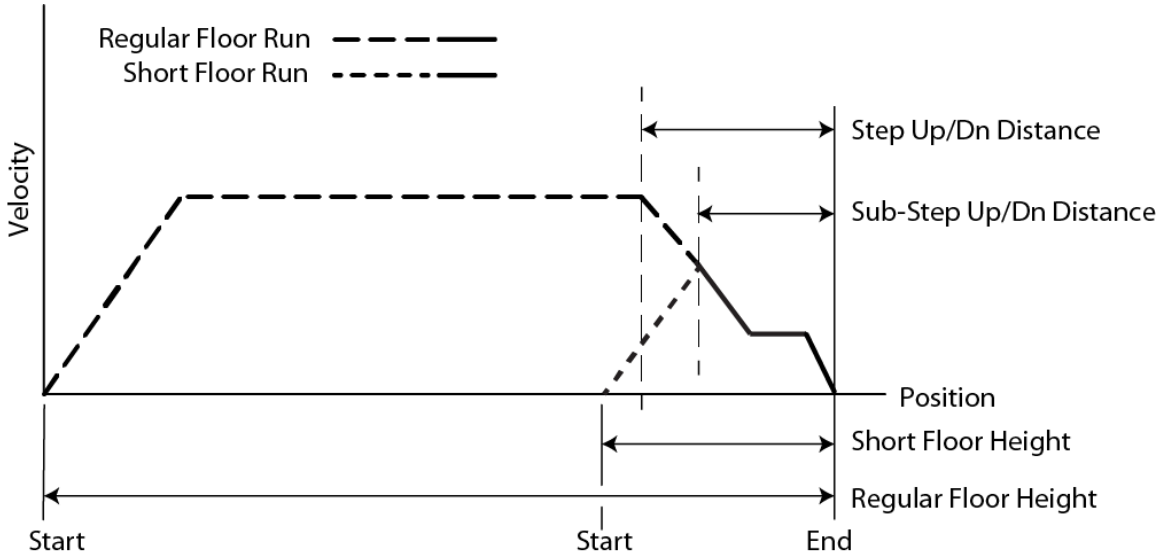
Initial Stepping Distances

The initial settings for the run up and run down stepping distances were set at the factory using Table 2, Hydro Initial Stepping Distances on page 17. When running up to a floor, the floors step up position forces the elevator to drop high speed if has not already done so. When running down to a floor, the floors step down position performs the same function. These settings can be verified or adjusted through the F7 parameters #209 + Step Dn"x" and 210 + Step Up"x".

Motion 2000 Hydro Short Floors

A landing that is too close to an adjacent landing such that, on a one-floor run, the car fails to reach contract speed before reaching the stepping (Step Up/Dn) distance for the destination floor is termed a “short floor” (see figure below). If the regular Step Up/Dn distance were used, the car would slow to leveling speed too soon and would be required to travel at leveling speed longer than desired. Therefore, an alternate stepping distance is provided (Sub-Step Up/Dn). When F7 parameter #208 (Stepping System) is set to “Dual”, the Sub-Step Up/Dn distance is used for a one floor run to any floor for which the Sub-Step Up/Dn parameters are not set to zero (0.0). When the destination floor is a terminal landing, an additional hardware cam operated switch (Short Floor Cam Sw), connected to input LIM0 on the HC-CTL-2 board, is used as backup to ensure that stepping takes place.

Figure 3.1 Regular Floor Run vs. Short Floor Run



Note

The ideal Sub-Step Up/Dn distances must be determined by trial and error. The Short Floor Cam switch should be positioned a little closer to the terminal landing than the Sub-Step Up/Dn distance.

Motion 2000 Door Position Monitor Switch (If used)

If you are in a jurisdiction where ASME A17.1 - 1996 or later is being enforced, Door Position Monitor switch(es) connected to the DPM and/or DPMR inputs must be added to monitor the position of the closed doors. This must be a separate physical limit switch that makes up approximately 1 to 2 inches before the doors lock. Please refer to the DOOR POSITION MONITOR and DOOR CLOSE LIMITS options in the controller manual.

iControl

Follow the hoistway learn procedures in the iControl manual.

Door Zone Verification

Following the hoistway learn process, starting at the top floor, move the car down on inspection and verify that the door zone indicators (e.g., LEDs, relays, diagnostic status, etc.) activate only at the appropriate locations at the landings (i.e., +/- 75 mm or 3") and nowhere else. Be sure to check rear door zones as well, where applicable.

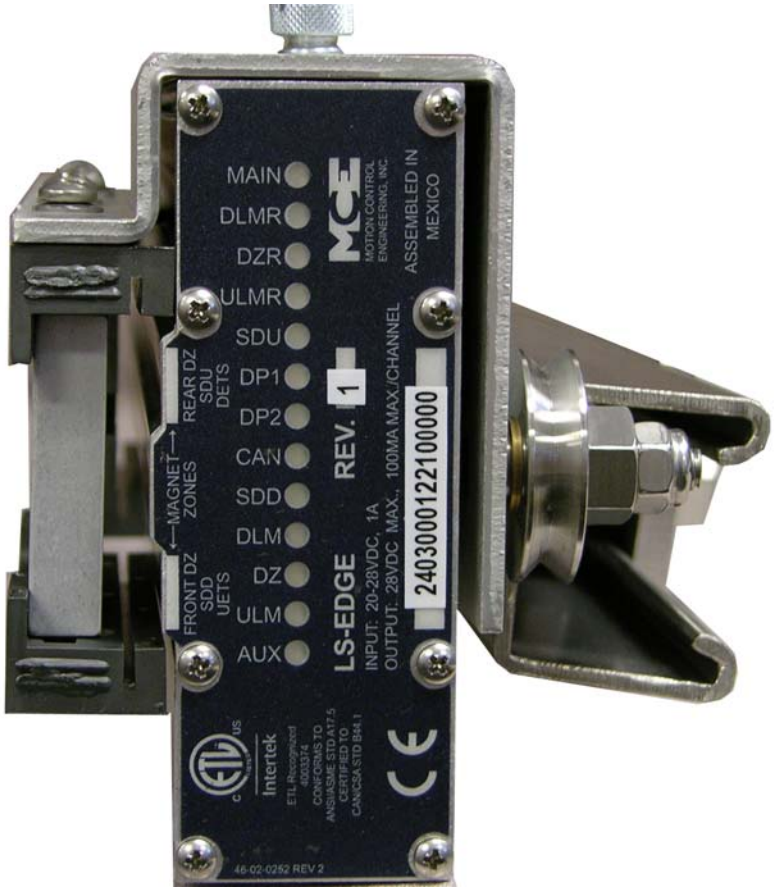
Permanently Attach Magnets

Once the hoistway has been successfully learned and door zone magnet placement is satisfactory, you may "lock" the magnets in place by placing a drop of silicone adhesive immediately above the top end and immediately below the bottom end of each magnet.

Indicators

Lighted indicator LEDs on top of the sensor unit provide information about active signals.

Figure 4. Indicator LEDs



MAIN: Sensor processor A active.

DLMR: Down Level Marker Rear.

DZR: Door Zone Rear.

ULMR: Up Level Marker Rear.

SDU: Slow Down Up.

DP1:Quadrature pulse.

DP2: Quadrature pulse.

CAN: CAN communication activity.

SDD: Slow Down Down.

DLM: Down Level Marker (Front).

DZ: Door Zone (Front).

ULM: Up Level Marker (Front).

AUX: Sensor processor B active.

- DP1, DP2: Quadrature pulses (iControl). DP1 leads when the car is traveling up. DP2 leads when the car is traveling down. Alternately active whenever the car is in motion.
- CAN: Motion 4000 or Element CAN communication with landing system is active.

Updating Software

If the LS-EDGE you are installing is a replacement unit, you will need to update software to match your system (Motion, Element, iControl) and revision level.

Motion 2000 / 4000 Controls

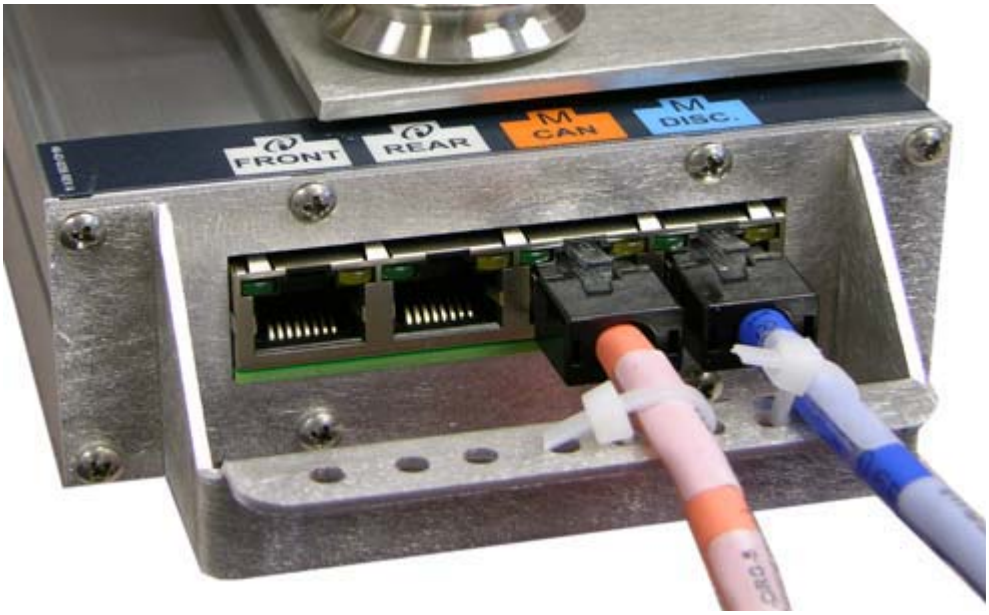
Caution

This instruction applies ONLY WHEN replacing an LS-EDGE unit in field. A firmware update is not necessary if the LS-EDGE unit is shipped with a new controller.

Replace Unit

1. Before replacing the LS-EDGE unit, move the elevator to bottom landing (if possible).
2. Place car on **MACHINE ROOM INSPECTION**.
3. Turn off controller power at the main disconnect.

Figure 5. LS-EDGE Connections

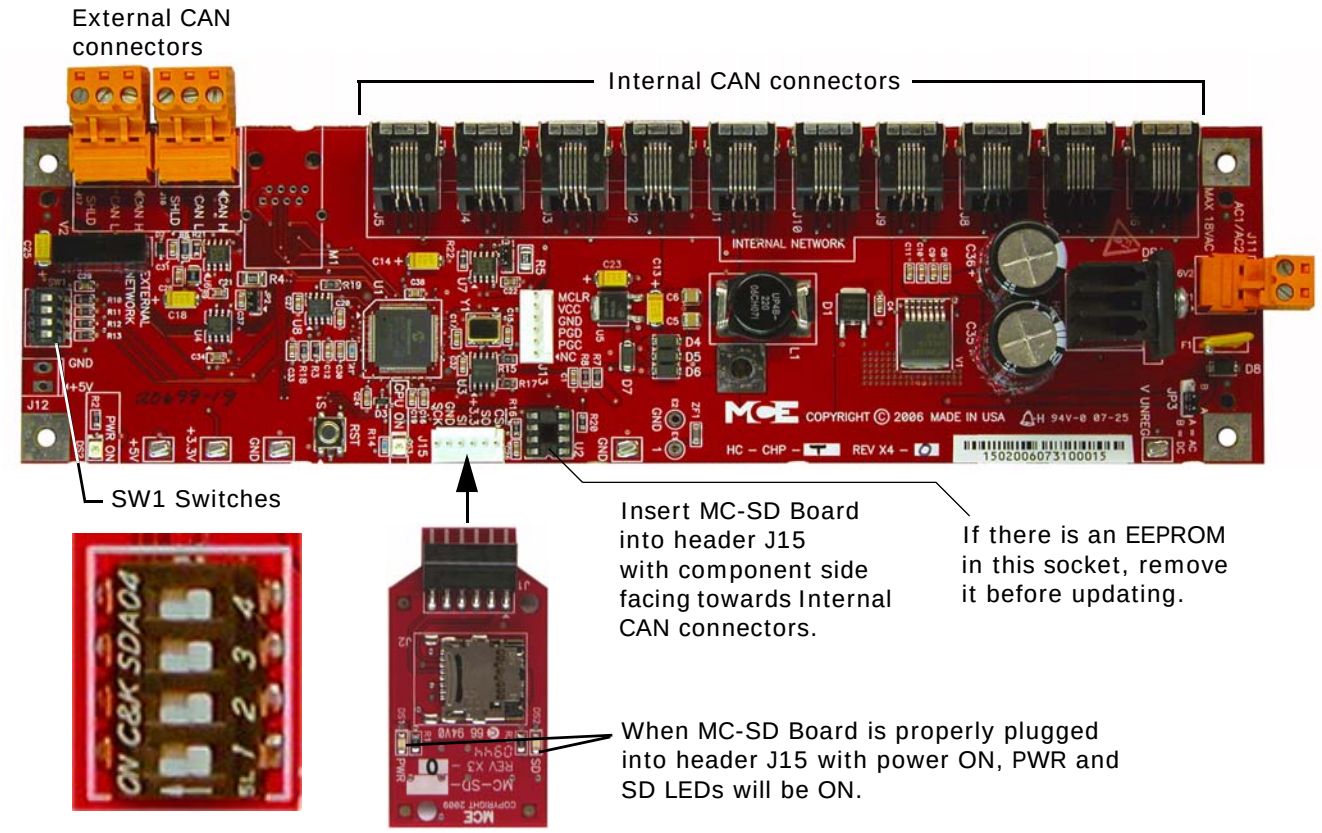


4. Cut the tie-wraps used to secure the Blue and Orange Ethernet cables. Remove the following connections from the existing LS-EDGE board.
   - Orange Ethernet cable from connector labeled as M CAN.
   - Blue Ethernet cable from connector labeled as M DISC.
5. Remove the two thumb screws on the side of the housing. Remove the LS-EDGE core assembly.
6. Install the new LS-EDGE core assembly and torque thumb screws to 10 - 12 in-lbs.
7. Reconnect both Ethernet cables to original positions. Attach with new tie-wraps.

Motion 2000 / 4000 Update Firmware

1. Before updating firmware, disconnect the following connections:
   - **For Simplex:** No action required.
   - **For Duplex or Group Controller:** Disconnect the External Network cable from connector J4 on HC-MPU.

Figure 6. HC-CHP CAN Hub and Power Supply board



2. Insert the **MC-SD board with original or desired software** into header J15 with component side facing the Internal CAN connectors (see illustration).
3. Place HC-CHP SW1 dip switches **1, 2 and 3 in the ON** position. (This setting updates firmware if it is different from existing.) Restore controller power.

After **CHECKING FOR CHP BOOTROM VERSION** and **STARTING BOOTROM VERSION: NNN.NNN** messages are displayed, **SCANNING BOARDS** and then **SCANNING GROUPS** will be displayed and the firmware update process will begin. **UPDATING BOARDS,** then **UPDATING LS-EDGE A, LS-EDGE B and LS-EDGE C** are displayed.

Once the LS-Edge board is updated, the MPU will display **PROCESS BOARDS,** then **UPDATE REPORT**.

Note

Note: If replacement unit has the correct software, the MPU displays as described in next step.

4. If the upgrade is successful or if the replacement unit already has the correct software, **MOTION CONTROL ENGINEERING, INC** followed by **MOTION CONTROL M-4000** will be displayed and the controller will begin operating.
5. If an error message is displayed or if the firmware upgrade doesn't finish in about 6 minutes or is not successful, power the controller down for 30seconds, then back up to restart the upgrade. If the upgrade is still not successful, contact MCE.
6. When the firmware has been successfully upgraded, return **SW1 dip switches 1, 2 and 3** to off position.
7. Verify software version by setting HC-MPU board F1 and F8 switches in UP position. Press "N" to check software versions for various boards. If the new LS-EDGE is communicating and firmware updated correctly, the HC-MPU board will display the new LS-EDGE unit software for LS-EDGE A, LS-EDGE B and LS-EDGE C processors.
8. Power Down. If the car was part of a Duplex or Group installation, re-connect the previously disconnected cables.
9. The MC-SD board in header J15 on the HC-CHP board is only used for programming. The controller does not need it for daily operation. Remove it and put it back in the original ESD bag for future use.
10. Restore controller power.

Confirm Operation

1. Run the elevator on Machine Room Inspection and make sure speed is correct and the car runs smoothly.
2. You must re-learn the Floor Height to save the floor height data in LS-EDGE. Refer to controller manual section **Final adjustment- Hoist way Learn- LS-EDGE** to perform this step.
3. Move the elevator to the middle of the hoistway on Machine Room Inspection. Place the car on test mode and automatic operation. Once elevator corrects to a floor, perform a one floor run and make sure the car stops correctly.
4. Check all floors for proper stopping. Make a full hatch run and make sure faults are not tripped at terminal landings.
5. Perform the following safety tests.
   - Inspection over speed test
   - Hoistway access operation to validate that car can't run more than 75 FPM in this mode.
   - ETS test for LS-Edge
6. Once testing is completed, turn off Test mode. Verify correct operation on automatic (passenger) mode.