# Motion 4000 Quick Start

**MCE**
**Motion Control Engineering**®
A Kinetek Company®

**1** Check the software version. Verify R008 in the top line.

```
R008 D
Ver# T00.08.0042
```

F8  F7  F6  F5  F4  F3  F2  F1
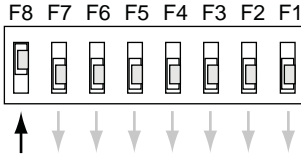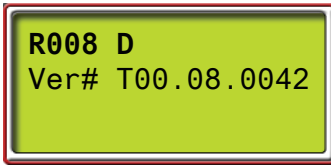
See job prints for wire type & gauge. All connections (power, brake, encoder) must be in separate conduit. 2" conduit recommended for encoder connection so that the connectors do not have to be removed.
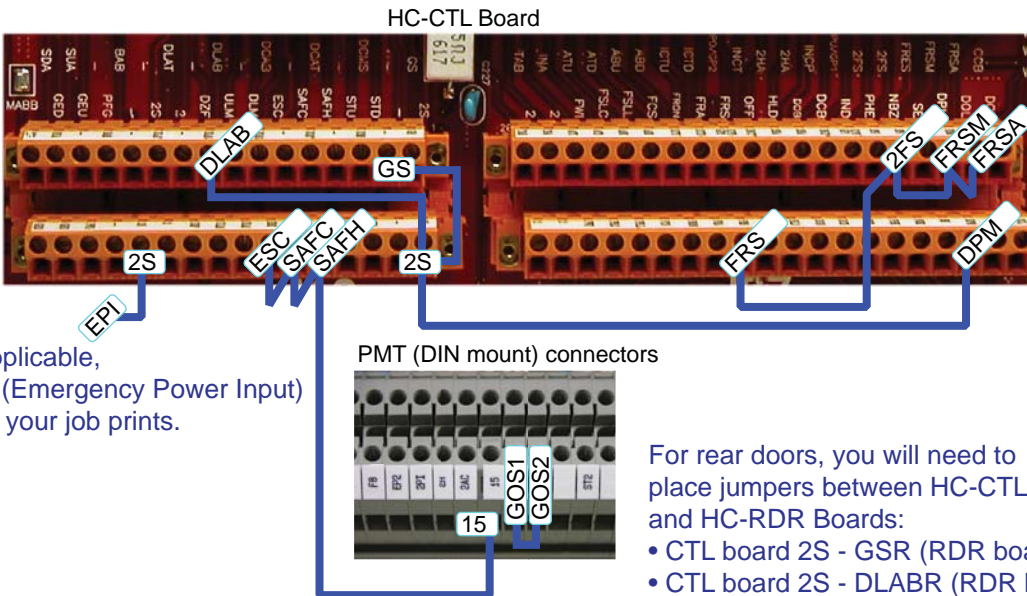
**2** Complete power and motor connections.

Disconnect
L1
L2
L3

Torqmax/KEB AC Drive

AC Drive Ground

Brake

Machine

Encoder

U  V  W

Inductor
L1  L2  L3

PM
U  V  W

Shield Ground

B1  B2    B3  B4   For second, independent machine brake if applicable.
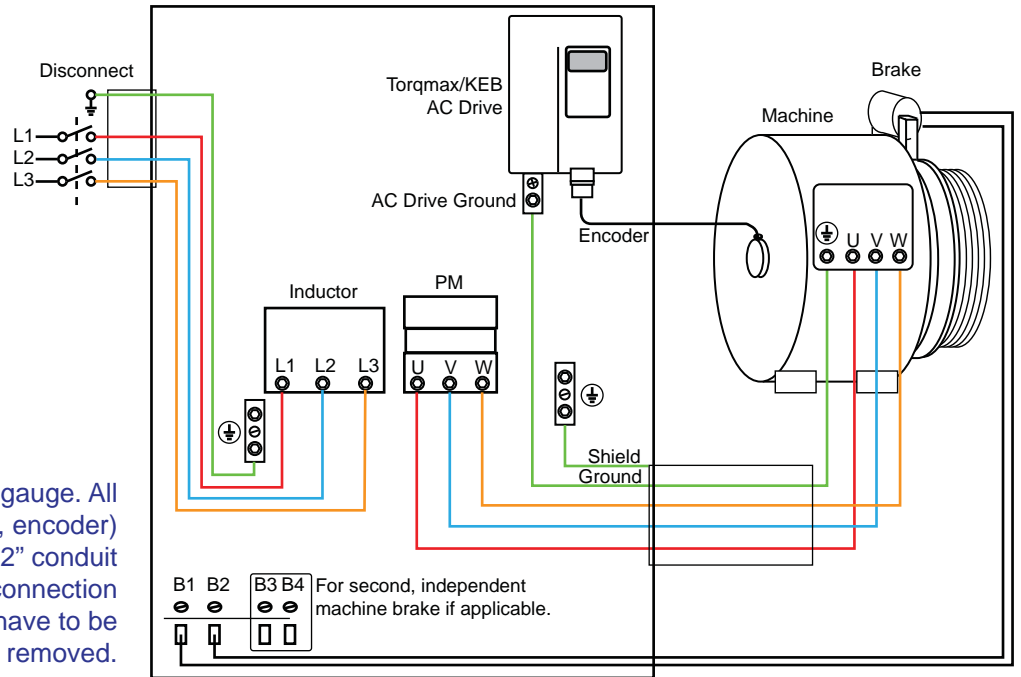
**3** Place construction mode jumpers.

HC-CTL Board

DLAB
GS
2FS  FRSM  FRSA
ESC  SAFC  SAFH
2S
FRS
DPM
2S
EPI

TC-MPI Board

RG7
RG5
If applicable, Rope Gripper

CW1
CW2
If applicable, Counterweight seismic movement detection

If applicable, EPI (Emergency Power Input) See your job prints.

PMT (DIN mount) connectors

15  GOS1  GOS2

For rear doors, you will need to place jumpers between HC-CTL and HC-RDR Boards:
• CTL board 2S - GSR (RDR board)
• CTL board 2S - DLABR (RDR board)

**4** Make sure equipment is ready.

• Machine brake is in good shape and properly seated on the braking surface.
• Counterweight is equal to car with 45% of rated load.
• Brake will hold car loaded to 125% of rated load.

## 5. Initial Movement on Machine Room Inspection

1. Place car on Inspection. Verify drive LF.4 motor selection. Check drive software level LF.80. Verify F7 148 (motor speed), F7 184 (drive) correctly set: Drive v1.6x = KEB F5-GLS49 (gearless) or KEB F5-GRD49 (geared). Drive v1.7x = KEB F5-GLS50 (gearless) or KEB F5-GRD50 (geared).
2. Bypass faults on Inspection: Place jumper on HC-CTL board JP1. Set F3 switch up. Press N until CONTROLLER SYSTEM MENU displayed. Press S to enter. Press N until **INSPECTION** MODE FAULT BYPASS is displayed. Press S to set to ON. Set F3 down.
3. Verify HC-CTL SAFS, SAFL relay LEDs (next to relays) lighted.
4. Run on Inspection. Avoid terminal landings until you are sure of the brake.
5. Pick a direction. Observe drive parameter LF.89 (positive moving up/negative moving down), LF.93, Actual Phase Current. Observe direction of motor rotation. If necessary, adjust drive parameter LF.28 (Encoder Channel Swap/Direction) until LF.93 is below motor FLA and direction of rotation is correct.
7. With F7 141 = 100%, verify inspection speed is as set using a hand tach (or F3>SYSTEM MODE>POSTN & SPEED if ELGO landing system installed).
8. If inspection speed is not as expected, verify F7 149 (contract speed), F7 155 (inspection speed), F7 148 (hoist motor speed), and drive LF.22 set to 115% of LF.25. Speed calibration is accomplished with F7 148 (hoist motor speed).

INSPECTION MODE
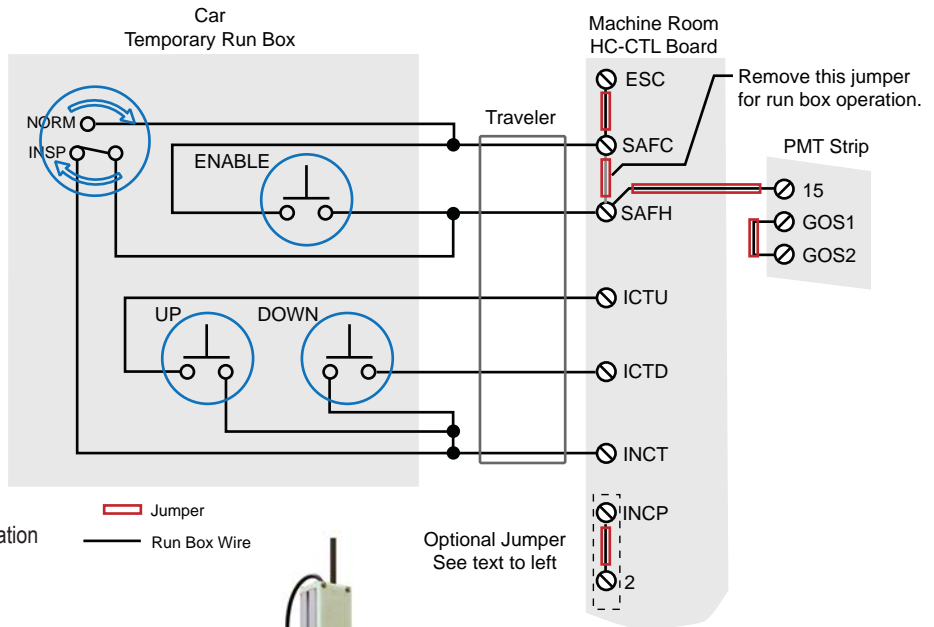FAULT BYPASS ON

F8  F7  F6  F5  F4  F3  F2  F1
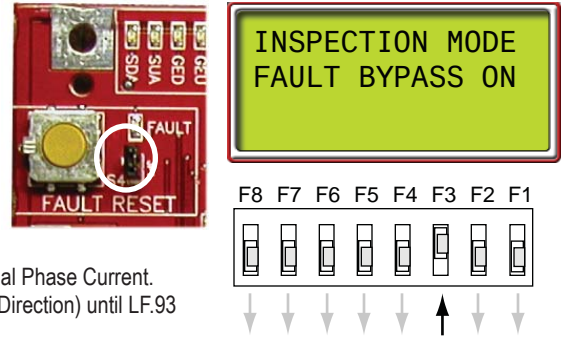
### Common Problems

- PM Contactor picks but car does not move:
  - Inspection speed (F7 155) set to zero
  - Manual acceleration (F7 173) set to zero
  - Speed set to zero (KEB LF.20, F7 149)
- PM Contactor does not pick - no fault message displayed
  - Inspection hierarchy interfering (Cartop or In-Car Inspection on while trying to run in Machine Room Inspection)
  - DLK string not made (DLAB and GS must have 120VAC)
  - Both SAFS and SAFL on HC-CTL board must be picked
- Verify Fault Bypass to INSPECTION mode, not AUTOMATIC
- KEB drive must be in RUN mode (LF.3) to run elevator
- EPI jumpered to 2 bus if necessary

### 6. Run Box if Used

See illustration to right. For safety, keep controller on Machine Room Inspection while using run box. If jumper installed between HC-CTL SAFC and SAFH, remove it to use run box. Jumper shown from 2 Bus to INCP prevents car from reverting to Normal Mode if/when there is a loss of connection to INCT. Machine Room Inspection operation from controller is prevented until INCP/2 Bus jumper removed.

Car Temporary Run Box

Machine Room HC-CTL Board

NORM
INSP
ENABLE

Traveler

ESC
Remove this jumper for run box operation.
SAFC
PMT Strip
SAFH
15
GOS1
GOS2

UP    DOWN
ICTU
ICTD
INCT

Jumper
Run Box Wire

INCP
Optional Jumper See text to left
2

### 7. Hoistway Setup

1. Install cartop interconnect box per job prints.
2. Install hoistway switches. All but Final Limits may be virtual.
3. Install landing system per manual section 2 and job prints (if ELGO, cable exits sensor at top).
4. Learn building floors (F6 menu, follow displayed instructions).
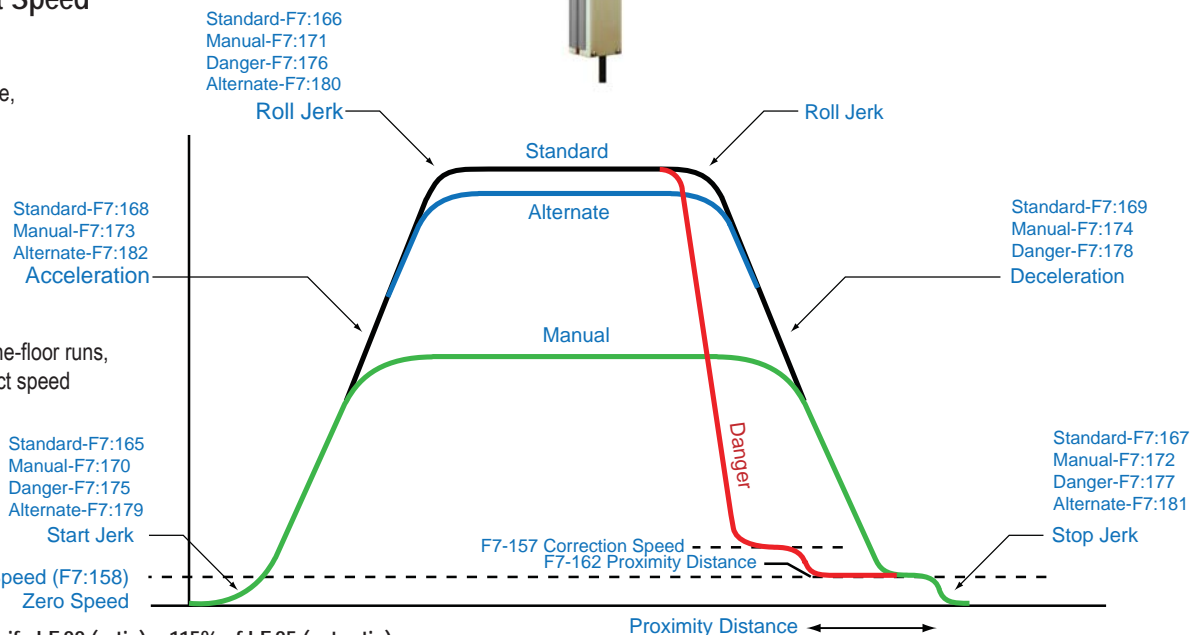
### 8. Bring Car Up to Contract Speed

Performance curves shown and operating speeds that use them are:

- Standard Curve: High, intermediate, earthquake and correction speed
- Alternate Curve: Auxiliary and backup power speed
- Manual Curve: Inspection and reduced inspection speed
- Danger "Curve": Emergency deceleration

1. Place on Normal operation. In F5 menu, place calls to make one-floor runs, then longer runs to achieve contract speed - stay away from terminals. Adjust F7 148 for accurate contract speed per F3 SYSTEM MODE> CONTROLLER SYSTEM MENU>POSTN/SPEED. If issues achieving contract speed, verify encoder PPR/set drive LF.27 accurately. **Verify LF.22 (ratio) = 115% of LF.25 (est ratio).**

Standard-F7:166
Manual-F7:171
Danger-F7:176
Alternate-F7:180
Roll Jerk

Roll Jerk

Standard

Alternate

Standard-F7:169
Manual-F7:174
Danger-F7:178
Deceleration

Standard-F7:168
Manual-F7:173
Alternate-F7:182
Acceleration

Manual

Danger

Standard-F7:165
Manual-F7:170
Danger-F7:175
Alternate-F7:179
Start Jerk

Leveling Speed (F7:158)
Zero Speed

F7-157 Correction Speed
F7-162 Proximity Distance

Standard-F7:167
Manual-F7:172
Danger-F7:177
Alternate-F7:181
Stop Jerk

Proximity Distance

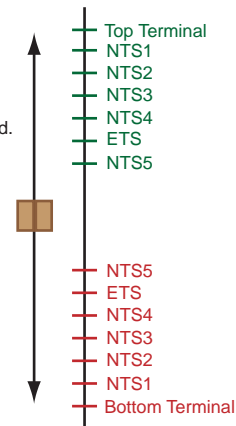## ETS/NTS Positions and Speeds

### Set Switch Distances

1. Car on inspection. Move to middle of hoistway. Temporarily set speeds of ETS and NTS switches USED ON JOB to 10 FPM over contract to prevent their influence.
   - DETS: F7 104
   - UETS: F7 75
   - DNTS5: F7 128
   - UNTS5: F7 99
   - DNTS4: F7 123
   - UNTS4: F7 94
   - DNTS3: F7 118
   - UNTS3: F7 89
   - DNTS2: F7 113
   - UNTS2: F7 84
   - DNTS1: F7 108
   - UNTS1: F7 79

   > If learned speed values exceed contract speed, contact MCE Technical Support.

2. Place call to top landing. Car must land without a fault. Place call to bottom landing. Car must land without a fault.
3. In F5 Control Utility, MPI-A diagnostics menu, note distances from each terminal at 90% contract speed, 80%, 70%, 60%, 50%, and 40%.

View in the F5 MPI-A menu:

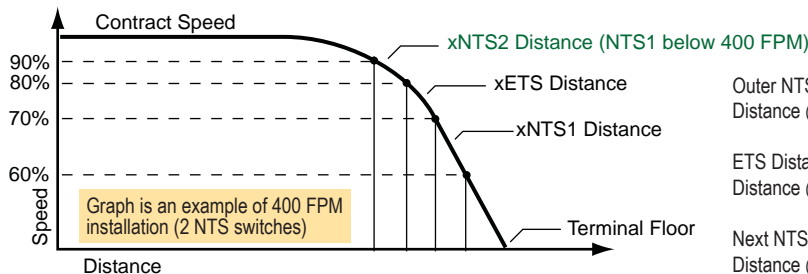| | Down | Up |
|---|---|---|
| 90% | 401 | 411 |
| 80% | 402 | 412 |
| 70% | 403 | 413 |
| 60% | 404 | 414 |
| 50% | 405 | 415 |
| 40% | 406 | 416 |

Highest numbered NTS switch **used** is farthest from terminal. NTS1 must always be within the terminal floor even when it is the only NTS switch used.

Top Terminal
NTS1
NTS2
NTS3
NTS4
ETS
NTS5

NTS5
ETS
NTS4
NTS3
NTS2
NTS1
Bottom Terminal

xNTS2 Distance (NTS1 below 400 FPM)
xETS Distance
xNTS1 Distance
Terminal Floor

Graph is an example of 400 FPM installation (2 NTS switches)

Contract Speed
Speed — Distance

**Outer NTS Distance**
Distance @ 90% + Distance @ 80% divided by 2

**ETS Distance**
Distance @ 80% + Distance @ 70% divided by 2

**Next NTS in Distance**
Distance @ 70% + Distance @ 60% divided by 2. And so on.

4. In F7 menu, set ETS switch distances to (Distance at 80% contract speed + Distance @ 70%) divided by 2 (UETS: F7 76 / DETS: F7 105).
5. For NTS switches, at least U/DNTS1 must be used and placed within the top/bottom terminal landing. Outermost NTS will be U/D NTS5, NTS4, NTS3, NTS2, NTS1 depending on number of switches used. Set outermost NTS switches to Distance at (90% CS + Distance at 80% CS) divided by 2. Moving toward terminals, set the NTS just inside the ETS to (Distance @ 70% + Distance @ 60%) divided by 2, the next to (Distance @ 60% + Distance @ 50%) divided by 2 and so on.

| Switch | UNTS5 | DNTS5 | UNTS4 | DNTS4 | UNTS3 | DNTS3 | UNTS2 | DNTS2 | UNTS1 | DNTS1 |
|---|---|---|---|---|---|---|---|---|---|---|
| Distance | F7 100 | F7 129 | F7 95 | F7 124 | F7 90 | F7 119 | F7 85 | F7 114 | F7 80 | F7 109 |

$$\frac{D\ @\ nn\% + D\ @\ nn\% - 10\%}{2}$$

### Terminal Learn

1. Move car far enough from top terminal to achieve contract speed. Place on Test. Set switch F5 up. Press N until TERMINAL LIMIT UTILITIES menu is displayed. Press S. Follow display instructions. Terminal Learn will only start in the up direction.

| PERFORM UxTS AND DxTS LEARN | TERMINAL LEARN [S] START | LEARN READY [S] LEARN | LEARNING UxTS MOVING UP | UxTS LEARNED [S] LEARN DxTS | LEARNING DxTS MOVING DOWN | SAVING SWITCHES PLEASE WAIT | TERMINAL DONE [S] EXIT |
|---|---|---|---|---|---|---|---|

Press S →

2. After pressing S to exit, place F5 switch down. Take car off Test. Place car on Inspection. Terminal learn is complete.

### Verify F7 Speed Values

Your values should be the appropriate percentage of your contract speed at each switch. Check up/down switch values:
1. U/DETS SPEED, 75% of Contract: Up F7 75, Down F7 104.
2. Moving toward terminals, verify consecutive switch settings 85%, 65%, 55%, 45%, 35%.

| Switch | UNTS5 | UNTS4 | UNTS3 | UNTS2 | UNTS1 | DNTS5 | DNTS4 | DNTS3 | DNTS2 | DNTS1 |
|---|---|---|---|---|---|---|---|---|---|---|
| Speed | F7 99 | F7 94 | F7 89 | F7 84 | F7 79 | F7 128 | F7 123 | F7 118 | F7 113 | F7 108 |

### Set ETS Switch Delta Values

1. Set Delta Speed: UETS DELTA SPEED: F7 78, DETS DELTA SPEED: F7 107 to 10% of learned speed value.
   Learned Speed @ switch + Delta Speed ≤ 95% Contract Speed.

### Set NTS Switch Delta Values

200 FPM or above: For each NTS switch used, set DELTA LOW SPEED to 3% of Learned speed of switch. Set DELTA HIGH SPEED to 6% of Learned speed of switch.
199 FPM or below: For each NTS switch used, set DELTA LOW SPEED to 2% of Learned speed of switch. Set DELTA HIGH SPEED to 4% of Learned speed of switch.

| Switch | UNTS5 | UNTS4 | UNTS3 | UNTS2 | UNTS1 | DNTS5 | DNTS4 | DNTS3 | DNTS2 | DNTS1 |
|---|---|---|---|---|---|---|---|---|---|---|
| Delta Low | F7 102 | F7 97 | F7 92 | F7 87 | F7 82 | F7 131 | F7 126 | F7 121 | F7 116 | F7 111 |
| Delta High | F7 103 | F7 98 | F7 93 | F7 88 | F7 83 | F7 132 | F7 127 | F7 122 | F7 117 | F7 112 |

### Adjustments

Settings provided are good in most situations. If you are tripping speed faults and/or overshooting terminals, work with appropriate settings including:
   - Delta speed margins
   - Adjusting switch positions
   - Adjusting deceleration and/or jerk rates
   - Adjusting brake tension

A. Adjusting deceleration/jerk rates will require relearning speed values.
B. Moving switches will require a new Terminal Learn. Drive tuning to improve control may require a new Terminal Learn.

## 9. Acceptance Tests
ALWAYS HAVE A TECHNICIAN STANDING BY TO SHUT DOWN THE ELEVATOR IF REQUIRED.

### SAFH Safety String Test
1. Remove wire from PMT terminal 15 or activate any safety device in the string.
2. A safety message will scroll on the MPU display.
3. Verify Safety Relay dropped out, car cannot be run.
4. Reinstall wires.

### SAFC Safety String Test
1. On CTL board, remove all wires from SAFC input or activate any safety device in the string.
2. Message CAR SAFETY DEVICE OPEN should scroll on MPU display.
3. Verify Safety Relay dropped, car cannot be run.
4. Reinstall wires.

### Motor Contactor Proofing Test
Perform with car stopped and with car in motion. Once fault is generated, car should not be allowed to move until contactor is released.

Car stopped at floor:
1. Activate PM contactor with non-metallic object.
2. Observe car will not run. MPU displays "PMP input failed to activate".

Car in motion:
1. Place a call. With car in motion, use a non-metallic object to activate and hold the PM contactor "on".
2. After car stops at selected floor, verify it will not continue to run.

### Brake Contactor Proofing Test
Perform with car stopped and with car in motion. Once fault is generated, car should not be allowed to move until contactor is released.

Car stopped at floor:
1. Activate BR contactor with non-metallic object.
2. Observe car will not run. MPU displays "BRP input failed to activate".

Car in motion:
1. Place a call. With car in motion, use a non-metallic object to activate and hold the BR contactor "on".
2. After car stops at selected floor, verify it will not continue to run. UIM (unintended motion fault) may occur if car drifts far enough.

### Directional Limits Test
These tests are used to verify proper operation of the elevator up and down direction limits.
1. Set F7 parameter 68 Direction Limit Distance to desired distance.
2. Verify F3 > Controller System Menu > Inspection Mode Fault Bypass parameter BYPASS OFF.

Down direction limit test:
1. Run car to floor above bottom landing.
2. Run car on Inspection down below bottom landing until car stops.
3. Verify Final Limit not opened and car stopped approximately distance F7 parameter 68 Direction Limit Distance.

Up direction limit test:
1. Run car to floor below top landing.
2. Run car on Inspection up past top landing until car stops.
3. Verify Final Limit not opened and car stopped approximately distance F7 parameter 68 Direction Limit Distance.

### Final Limit Tests
1. Place car on Inspection. Set F3 > Controller System Menu > INSPECTION MODE FAULT BYPASS = BYPASS ON. MPU display will scroll FAULT BYPASS IS ACTIVE (INSPECTION).

Lower final limit test:
1. Place car one floor above bottom landing. Run down on Inspection until car stops. MPU displays HOISTWAY SAFETY DEVICE OPEN.
2. HC-CTL board, place a jumper between 2 bus and SAFH. Run car up on Inspection.
3. Remove jumper.

Upper Final limit test:
1. Place car one floor below top landing. Run up on Inspection until car stops. MPU displays HOISTWAY SAFETY DEVICE OPEN.
2. HC-CTL board, place a jumper between 2 bus and SAFH. Run car down on Inspection.
3. Remove jumper. F3 > Controller System Menu > INSPECTION MODE FAULT BYPASS = BYPASS OFF.

## Buffer Tests

Verifies car striking buffer causes machine to break traction and car buffer will return to fully extended state after having been fully compressed. This is a two-part test. Test assumes contract speed.

**Car Buffer Test**

1. Full load in car. Run to top landing. Place on Inspection.
2. F3 > Controller System Menu > INSPECTION MODE FAULT BYPASS = BYPASS ON. MPU displays FAULT BYPASS IS ACTIVE (INSPECTION). Set F3 down. Place jumper 2 bus/SAFH.
3. Function switch F5 UP. Press N until TERMINAL LIMIT/UTILITIES menu displayed. Press S to select.
4. Press N until PERFORM TERMINAL TESTS displayed. Press S to select. TERMINAL TEST RUN/QUIT will display. Press S to start test.
5. With TERMINAL TEST ARM/QUIT displayed, press S. LCD will display TERMINAL TEST - READY TO MOVE.
6. Run car down using Inspection switches. Display - TERMINAL TEST IN PROGRESS.
   • Release switches when car contacts buffer and ropes lose traction.
   • Car must strike buffer, compress fully, cause machine to break traction.
   • Check ropes before attempting to move car again.
7. Display - TERMINAL TEST DONE. PRESS S. Press S. Exit F5 menu. Remove jumper 2 bus/SAFH. INSPECTION MODE FAULT BYPASS to BYPASS OFF.

**Counterweight Buffer Test**

As above except with an empty car running up.

## Inspection Overspeed Test

Verifies that moving the elevator on Inspection at speed greater than Inspection Overspeed setting (F7, 146) will cause an emergency stop.

1. On the MPU board, verify F3 > Controller System Menu > INSPECTION MODE FAULT BYPASS = OFF.
2. If contract speed 130FPM or above, set F7 146 = 125 FPM, F7 155 = 130FPM. If contract speed below 130 FPM, set F7 146 = 95% of contract speed, F7 155 = contract speed.
3. Run car up or down on Inspection. An emergency stop will occur when INSPECTION OVERSPEED value is exceeded. Display: MPI A, B, C, INSPECTION OVERSPEED. Return F7 parameters to original values.

## Contract Overspeed Test

Verifies that moving the car at speed greater than Contract Overspeed setting will cause an emergency stop.

1. Move car to bottom floor on Normal operation. Set drive LF.22 to 1.4 x value of LF.25. Set F7 141 PROFILE SCALE = 120%.
2. Call to top floor. When speed exceeds Contract Overspeed, car must perform emergency stop, message MPI A, B, C CONTRACT OVERSPEED.
3. Return F7 and drive parameters to original settings.

## Leveling Overspeed Test (Logic Verification)

Verify car emergency stop if, while leveling, it is traveling at a speed above Leveling Overspeed setting.

1. Set F7 158 to 2 or 3 (leveling speed). Set F7 147 = 1 (leveling overspeed), F7 160 = 5 inches, F1 > Door Operation Menu > PRE-OPENING? = Yes.
2. Call to floor NOT near limits. As car is leveling: Emergency stop, display MPI-A or B LEVELING OVERSPEED.
3. Return parameters to original value.

## Normal and Emergency Terminal Switch Tests

Obtain list of learned speeds at all ETS and NTS switches used. At contract speeds below 400 FPM, verify F7 parameters:



Graph is an example of 400 FPM installation (2 NTS switches)

- #70 NTS1 = VIRTUAL
- #69 U/DETS = VIRTUAL
- #74 NTS5 = UNUSED
- #73 NTS4 = UNUSED
- #72 NTS3 = UNUSED
- #71 NTS2 = UNUSED (VIRTUAL if 400 FPM contract speed)
- xNTSn SPEED = Speed value of switch
- xNTSn DISTANCE - Switch to terminal distance
- xNTSn DELTA DISTANCE - Margin of error allowed to not see switch
- xNTSn DELTA LOW SPEED - Positive offset from xNTSn SPEED value for DELTA LOW SPEED FAULTS
- xNTSn DELTA HIGH SPEED - Positive offset from xNTSn SPEED value for DELTA HIGH OVERSPEED FAULTS
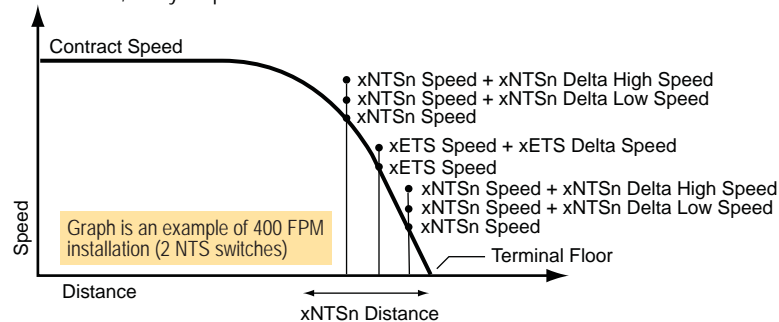
Note: If more than one set of virtual terminal switches are used, outer NTS and ETS switches can be prevented from tripping by setting them to unused. D/UNTS1 switches should never be set to unused.

**Outer NTS Delta High Speed Test**

1. Set Delta Low Speed of outer UNTS switch to 60 FPM to move it "out of the way". Move car away from top landing far enough to reach contract speed. Put in TEST MODE.
2. Set HC-MPU switch F5 UP. Push N until TERMINAL LIMIT UTILITIES. Press S. Press N until PERFORM TERMINAL TESTS. Press S. TERMINAL TEST [S]-RUN [N]-QUIT. Press S. TERMINAL TEST/CMD: DN [N]-QUIT. Use +/- to select UP, press S.
3. GOING TO TOP displayed. Set F5 down while traveling. When car performs uncontrolled emergency stop, it will display UNT SW HIGH OVERSPEED.
4. Set F5 up, press + and N buttons to exit terminal tests. Return Delta Low Speed to original setting.
5. Repeat test for down direction outer DNTS switch.

**Outer NTS Delta Low Speed Test**

1. Set Delta High Speed of outer UNTS switch to 60 FPM to move it "out of the way". Move car away from top landing far enough to reach contract speed. Put in TEST MODE.
2. Repeat Step 2 above. When GOING TO TOP displayed. Set F5 down while traveling. When car performs controlled emergency slowdown, it will display UNT SW LOW OVERSPEED.
4. Set F5 up, press + and N buttons to exit terminal tests. Return Delta High Speed to original setting.
5. Repeat test for down direction outer DNTS switch.

### Continued NTS/ETS Testing

If more than one set of virtual terminal switches are used, outer NTS and ETS switches can be prevented from tripping by setting them to unused. Then, for the switch to be tested, perform high and low overspeed tests as previously described. Note that D/UNTS1 switches should never be set to unused.

### ETS Testing

If only one set of NTS switches (NTS1) used, ETS switches will be closest to the terminal landings.

1. NTS1 switches may not be set to unused, so set NTS1 switch speeds to contract speed to "move them out of the way" for ETS testing.
2. Complete ETS testing just as Delta High Speed for NTS switches. Once overspeed occurs, LCD displays UET SW OVERSPEED for top or DET SW OVERSPEED for bottom.
3. When overspeed occurs, car will level to a floor and latched fault ETS FAULT SHUTDOWN will appear and must be reset using the Fault Reset button.
4. Be sure to return NTS1 switch speeds to correct values when ETS testing is completed.

## Electrical Governor Test

Verifies calibration of electrical governor switch (typically about 110% of contract speed); proves car will execute emergency stop when switch activated. Car must run fast enough to trip electrical governor switch, but not so fast as to trip mechanical governor/safeties.

1. Verify no jumper GOS1/GOS2. Run to top landing. Set F3 > Controller System Menu > AUTOMATIC MODE FAULT BYPASS = BYPASS ON, LF.22 Gear Ratio to LF.25 x 2 (temporary setting to prevent clipping), F7 141 PROFILE SCALE = Value above electrical governor trip speed but less than mechanical trip speed (mechanical trip speed typically about 115% of Contract Speed).
2. Call to bottom landing. Car should accelerate then perform emergency stop. Place on Inspection. Reset electrical governor switch.
3. To reset emergency brake: TC-MPI board, press/hold EB RST for 8 seconds.
4. Set F3 > Controller System Menu > AUTOMATIC MODE FAULT BYPASS = BYPASS OFF. Return F7 and drive parameters to original settings.

## Ascending Car Overspeed Test

Mechanic determines appropriate weight to be placed in car.

1. Bring empty car to bottom floor with car and hoistway doors closed and locked.
2. Observe car speed at F3 POSTN SPEED and standby to engage brake if governor overspeed switch fails to open.
3. Use your preferred method to mechanically release the machine brake. The car will start to move up the hoistway.
4. When governor overspeed switch opens, emergency brake will engage, stop, hold car. Reset emergency brake: TC-MPI board, press/hold EB RST for 8 seconds.

## Car/Counterweight Safety Test

Two part test. Car safety testing verifies set safeties cause machine to break traction. Overspeed sufficient to trip governor mechanically, set car safeties. Electrical governor switch must not prevent car from reaching mechanical trip speed, safety operated switch (plank switch) must not open safety string.

### Car Safety Test

1. Car to top landing. F3 > Controller System Menu > AUTOMATIC MODE FAULT BYPASS = BYPASS ON. LF.22 gear ratio to LF.25 x 2, F7 141 PROFILE SCALE = Safety mechanical trip speed / Contract speed x 100.
2. Bypass electrical governor switch, jumper GOS1 to GOS 2.
3. Call to bottom landing. As car overspeeds, governor will trip, safeties will set, machine will break traction, car will stop.

$$\text{Profile Scale} = \frac{\text{Mechanical Trip Speed}}{\text{Contract Speed}} \times 100$$

4. Place on Inspection. Reset governor. Return drive and F7 controller to original values. If unintended motion fault occurs, perform Step 5. Otherwise Step 6.
5. TC-MPI board, press/hold EB RST for 8 seconds.
6. F3 > Controller System Menu > AUTOMATIC MODE FAULT BYPASS = BYPASS OFF. Remove jumper GOS1/GOS2. HC-CTL board, jumper SAFC to SAFH.
7. Run up on inspection to release safeties. Remove SAFC/SAFH jumper.

### Counterweight Safety Test

Verifies operation of counterweight safeties. Comparable to car safety test but performed in opposite direction. If counterweight has governor, jumper it out.

1. Car to bottom landing. F3 > Controller System Menu > AUTOMATIC MODE FAULT BYPASS = BYPASS ON.
2. Set LF.22 Gear Ratio to LF.25 x 2, F7 141 PROFILE SCALE = Safety mechanical trip speed / Contract speed x 100.
3. Jumper GOS1/GOS2: bypass Electrical Governor Switch.
4. Call to top landing. As counterweight overspeeds, governor will trip, safeties will set, machine will break traction, car will stop.
5. Place on Inspection. Reset governor. Return drive, F7 controller parameters to original values. If Unintended Motion fault occurs, perform Step 6. Otherwise Step 7.
6. Press/hold TC-MPI, EB RST button for 8 seconds.
7. Set F3 > Controller System Menu > AUTOMATIC MODE FAULT BYPASS = BYPASS OFF. Remove GOS1/GOS2 jumper.
8. On HC-CTL board, jumper SAFC/SAFH. Run down on Inspection to release counterweight safeties. Remove SAFC/SAFH jumper.

NOTE: If machine will not lift loaded car to release safeties, set drive LF.30 to 0 (open loop) and increase LF.37 setting by 1. Attempt to move car. If unable, again increase LF.37 by 1 and re-attempt. Be careful. Monitor machine for overheating. Once safties release, return LF.30 to correct setting.

## Emergency Brake Test - Unintended Motion, Rope Brake

Verify moving car away from landing with car and hoistway doors open (Unintended Motion) causes emergency brake/rope gripper to deploy and stop elevator. Demonstrates emergency brake will stop car within 48" if car drifts from floor.

1. Station mechanic at landing for safety. Bring car to landing away from terminal landings. Place on Independent service. Load car as required (100 - 125%). Place barricades to prevent entry.
2. Use non-metallic object to press/hold contactors PM and BR. As car moves away from floor, observe emergency brake stops and holds car within 48 inches (122cm) of floor level.
3. Restore normal operation: On Inspection, press EB RESET button on TC-MPI board for about 8 seconds.