



## **ETSD TEST PROCEDURE FOR TRACTION ELEVATORS**

The ETSD (emergency terminal slowdown device) system's job is to ensure that the elevator cannot run into the overhead or pit at a high rate of speed. This overspeed condition could be caused by a failure of the position system, or a failure of the drive to slow down. This document describes how to test each scenario.

To test a failure of the position system, the controller is prevented from seeing the normal slowdown point for the terminal landing. Consequently, when the car hits the ETSD switch, the normal slowdown has not yet been initiated. The ETSD switch will initiate a slowdown, causing the car to stop normally.

To test a drive failure, the drive is forced into high speed and prevented from slowing down as the car reaches a terminal landing. The ETSD system should then detect the overspeed condition and cause a brake stop of the elevator.

It is recommended that the test for the drive failure initially be done near the center of the hoistway to ensure that the ETSD system has been properly calibrated. Performing this test without properly setting up the ETSD system may allow the elevator to crash into the pit or overhead!

This test sequence assumes the car has One Floor Run and Full Speed operation. If the car achieves full speed on a one floor run, then ignore the steps for One Floor Run operation.

### **INITIAL SETUP REQUIRED BEFORE TESTING THE ETSD SYSTEM.**

1. Refer to the ETSD sheet in the schematic for the location of the Registers to be monitored. A hand-held programmer, or computer with GE programming software, is required to access these registers.
2. The ETSD system should have been set up by performing a "learn" as described on the ETSD sheet.
3. The values for the ETSD tables should be checked to verify that they look correct. The values in each table should start at values corresponding to the initial speed for that test, then approach zero throughout the table.
4. The values in the "Down" tables should be similar to the "Up" tables except the values will be negative in the "Down" table and positive in the "Up" table.
5. Monitor the ETSD Error register (see the ETSD sheet) to make sure the error is fairly small, and consistent, as the car stops at each terminal landing.



## **SCENARIO # 1 – FAILURE OF THE POSITION SYSTEM**

### **INITIAL TEST IN THE MIDDLE OF THE HOISTWAY.**

1. Run the elevator to any intermediate landing making sure that no one is inside.
2. Turn off the doors with the “Door Open” cutout switch to insure that no one gets into the elevator while testing. Turn on the “Test” input to disable hall calls.
3. Place a call at a landing several floors above the elevator’s current location.
4. As soon as the elevator reaches high speed remove the wire to the Up High Speed ETSD Switch (normally terminal 31A). This will simulate the switch opening at the top of the shaftway. The controller will start to slow down immediately, and the car will stop at the next floor. If the car passes the Leveling Switches for a floor, it may attempt to stop abruptly on those switches.  
**Note: These instructions assume that normally closed ETSD shaftway switches were used. If normally open switches were used jump terminal 1 to terminal 31A, 31B, 32A, 32B rather than removing the wire from these terminals as stated in these instructions.**
5. Return the car to an intermediate landing, and place a call one floor above the car.
6. After the car has moved out of the Leveling zone, but before it has reached One Floor Run Speed, remove the wire to the Up Slow Speed ETSD Switch (normally terminal 31B). The controller will drop relay “1FR” and the car will slow down.
7. Repeat these tests for the down direction, removing wires 32A and 32B, instead of 31A and 31B.

NOTE: To pass this test the car must drop the speed output relays (“1FR” and “FS”) and start to slow down as soon as the ETSD switch is tripped. If it does not, then there is a problem with the ETSD switch wiring, and this must be corrected before proceeding.

### **TESTING THE ETSD SYSTEM AT TERMINAL LANDINGS.**

Do not perform this test until all the steps listed above (Initial test of the ETSD system in the middle of the hoistway) have been successfully completed.

1. Run the elevator to the third landing. Make sure that no one is in the elevator and that the doors have been taken out of service so that no one can get into the elevator. Turn on the “Test” input to disable hall calls.
2. To prevent a slowdown from the normal means:
  - Jump the Down High and Slow Speed Terminal Landing Slowdown Limit Switches (normally terminals 3-19H and 3-19S)
  - With a conventional selector, disconnect the selector inputs for down slowdown.
  - With an Encoder based selector, change the value for the floor count for the third landing to a value equal to the fourth landing. (Make a note of the correct value for the third landing as this must be entered after the test.)
3. Place a car call at the bottom landing.
4. The elevator should accelerate to full speed and slow down off the ETSD switch. The car should stop normally at the bottom landing. **Note: If the car overshoots, then the ETSD**



**Switch is probably too close to the terminal landing. It should be as close as possible to the normal slowdown point as indicated by the position of the Terminal Landing Slowdown Switch, and the normal controller/selector slowdown.**

5. Reset the system by reconnecting the selector signals or resetting the floor count to the correct value to undo any changes made in step 2.
6. Run the car to the second landing and repeat steps 2 through 5.  
In step 2, with an Encoder based selector, change the value of the floor count for the second landing to a value equal to the third landing.  
In step 4, the car will accelerate to One Floor Run speed.
7. Reset the system by reconnecting the selector signals or resetting the floor count to the correct value to undo any changes made in step 2.
8. Run the car to the second landing from the top.
9. To prevent a slowdown from the normal means:
  - Jump the Up High and Slow Speed Terminal Landing Slowdown Limit Switches (normally terminals 3-18H and 3-18S)
  - With a conventional selector, disconnect the selector inputs for up slowdown.
  - With an Encoder based selector, change the value for the floor count for the second landing from the top to a value equal to the landing below. (Make a note of the correct value for the this landing as this must be re-entered after the test.)
10. Place a car call at the top landing.
11. The elevator should accelerate to full speed and slow down off the ETSD switch. The car should stop normally at the top landing. **Note: If the car overshoots, then the ETSD Switch is probably too close to the terminal landing. It should be as close as possible to the normal slowdown point as indicated by the position of the Terminal Landing Slowdown Switch, and the normal controller/selector slowdown.**
12. Reset the system by reconnecting the selector signals or resetting the floor count to the correct value to undo any changes made in step 9.
13. Run the car to the landing next to the top and repeat steps 9 through 12.  
In step 9, with an Encoder based selector, change the value of the floor count for the landing next to the top to a value equal to the landing below.  
In step 11, the car will accelerate to One Floor Run speed.
14. Reset the system by reconnecting the selector signals or resetting the floor count to the correct value to undo any changes made in step 9.
15. Remove any jumpers on the Terminal Landing Slowdown Limit Switches.

This completes the test of the ETSD system for a position system failure.



## **SCENARIO # 2 – FAILURE OF THE DRIVE**

### **INITIAL TEST IN THE MIDDLE OF THE HOISTWAY.**

1. Run the elevator to any intermediate landing making sure that no one is inside.
2. Turn off the doors with the “Door Open” cutout switch to insure that no one gets into the elevator while testing. Turn on the “Test” input to disable hall calls.
3. Force on the “1FR” and “FS” relays. This can be done by using the tabs on the front of the relays, if available, or by jumping the Terminal Landing Slowdown Limit Switches and PLC outputs. If this is done while the car is stopped, then Leveling will be disabled.
4. Place a call at a landing several floors above the elevator’s current location.
5. As soon as the elevator reaches high speed remove the wire to the Up High Speed ETSD Switch (normally terminal 31A). This will simulate the switch opening at the top of the shaftway. The controller will attempt to slow the car by dropping the speed output, but since this is overridden, the car will continue at full speed. The ETSD system will detect the failure to slow down and initiate a shutdown and the run relays will drop, causing the car to stop on the Brake.  
**Note: These instructions assume that normally closed ETSD shaftway switches were used. If normally open switches were used jump terminal 1 to terminal 31A, 31B, 32A, 32B rather than removing the wire from these terminals as stated in these instructions.**
6. Allow relays “1FR” and “FS” to operate properly, and return the car to an intermediate landing.
7. Force on the “1FR” relay. This can be done by using the tabs on the front of the relay, if available, or by jumping the Terminal Landing Slowdown Limit Switches and PLC outputs for “1FR” only. If this is done while the car is stopped, then Leveling will be disabled.
8. Place a call one floor above the car.
9. After the car has reached One Floor Run Speed, remove the wire to the Up Slow Speed ETSD Switch (normally terminal 31B). The controller will attempt to slow the car by dropping the speed output, but since this is overridden, the car will continue at One Floor Run speed. The ETSD system will detect the failure to slow down and initiate a shutdown and the run relays will drop, causing the car to stop on the Brake.
10. Repeat the tests for the down direction, removing wires 32A and 32B, instead of 31A and 31B.

NOTE: To pass this test the car must shut down soon after the ETSD switch is tripped. If it does not, then there is a problem with the ETSD switch wiring or setup, and this must be corrected before proceeding. There will be a slight delay before initiating the shut down. This is based on the ETSD Error Timer, which is an adjustable delay before initiating a shutdown after an overspeed is detected, and the ETSD Error, which is how much the ETSD error must be before it is considered to be an overspeed. If these values are too low, then false trips are possible. If they are too high then the car will travel too far before it shuts down if there is a real drive fault. The stopping distance is also affected by the setting of the Brake.

### **TESTING THE ETSD SYSTEM AT TERMINAL LANDINGS.**

Do not perform this test until all the steps listed above (Initial test of the ETSD system in the middle of the hoistway) have been successfully completed.



1. Run the elevator to the third landing. Make sure that no one is in the elevator and that the doors have been taken out of service so that no one can get into the elevator. Turn on the "Test" input to disable hall calls.
  2. To simulate a drive failure, by forcing it to stay in High Speed:
    - Force on the "1FR" and "FS" relays. This can be done by using the tabs on the front of the relays, if available, or by jumping the Terminal Landing Slowdown Limit Switches and PLC outputs. If this is done while the car is stopped, then Leveling will be disabled.
  3. Place a car call at the bottom landing.
  4. The elevator will accelerate to full speed. When it hits the ETSD switch, the controller will attempt to slow the car by dropping the speed outputs, but since they are overridden, the car will continue at full speed. The ETSD system will detect the failure to slow down and initiate a shutdown and the run relays will drop, causing the car to stop on the Brake. **Note: If the car overshoots, then refer to the comments at the end of the previous section, and adjust the ETSD Fault Timer, the ETSD Error value or the setting of the Brake.**
  5. Reset the shutdown by cycling the power, or the Inspection Switch.
  6. Run the car to the second landing and repeat steps 2 through 5.
    - In step 2, just force on the "1FR" relay, not the "FS" relay.
    - In step 4, the car will accelerate to One Floor Run speed.
  7. Reset the shutdown by cycling the power, or the Inspection Switch.
  8. Run the car to the second landing from the top.
  9. To simulate a drive failure, by forcing it to stay in High Speed:
    - Force on the "1FR" and "FS" relays. This can be done by using the tabs on the front of the relays, if available, or by jumping the Terminal Landing Slowdown Limit Switches and PLC outputs. If this is done while the car is stopped, then Leveling will be disabled.
  10. Place a car call at the top landing.
  11. The elevator will accelerate to full speed. When it hits the ETSD switch, the controller will attempt to slow the car by dropping the speed outputs, but since they are overridden, the car will continue at full speed. The ETSD system will detect the failure to slow down and initiate a shutdown and the run relays will drop, causing the car to stop on the Brake. **Note: If the car overshoots, then refer to the comments at the end of the previous section, and adjust the ETSD Fault Timer, the ETSD Error value or the setting of the Brake.**
  12. Reset the shutdown by cycling the power, or the Inspection Switch.
  13. Run the car to the landing next to the top and repeat steps 9 through 12.
    - In step 9, just force on the "1FR" relay, not the "FS" relay.
    - In step 11, the car will accelerate to One Floor Run speed.
  14. Reset the shutdown by cycling the power, or the Inspection Switch.
  15. Remove any jumpers on the Terminal Landing Slowdown Limit Sws or "1FR" and "FS" relays.
- This completes the test of the ETSD system for a drive failure.

