Controller Test Procedure

Galaxy III SCR (DC motor) Traction Elevator Controller

G.A.L. Manufacturing Corp.
50 East 153rd Street
Bronx, N.Y. 10451
Tel: (718) 292-9000 Ext. 205
Mobile: (845) 641-2346
E-mail: Peter.Novak@gal.com

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The following procedure describes the methods used to test the controller for compliance to the CAN/CSA B44-2010 code.

1. Redundancy & Monitoring in critical Circuits 2.26.9.3 & 2.26.9.4

1.1 Magnetically Operated Devices

Motor Contactor:

1-Critical Components: MC
2-Redundant Components: Computer Inputs --- P, DEL, MCAi, MCCi
Computer Outputs --- MCC, MCA
3-Circuit Conforms to 2.26.9.4: Yes
4-**Test 1**
Note: On the following tests, the car may verify the start condition three times before shutting down. Please allow sufficient time for the error condition to be tested all three times.

Before the car completes a run in either direction, hold in the MC contactor. Place a call to another landing. Observe that the car shuts down at the landing and does not restart. To restore the car to normal operation, release the MC contactor.

Before the car completes a run in either direction, **CAREFULLY** jump terminal "S10" to terminal "MCC" on the GALX-1038N board revision C or D otherwise it is terminal "MC", this will hold in the MC contactor. Place a call to another landing. Observe that the car shuts down at the landing and does not restart. To restore the car to normal operation, **CAREFULLY** remove the jumper between "S10" and "MCC" on the GALX-1038N board revision C or D otherwise it is terminal "MC".

While the car is stopped at a landing, **CAREFULLY** jump terminal "S10" to terminal "MCA". Place a call to another landing. Observe that the car shuts down at the landing and does not restart. To restore the car to normal operation, CAREFULLY remove the jumper between "S10" and "MCA".

Brake Contactors:

1-Critical Components: BRK, RUN
2-Redundant Components Computer Inputs --- DON, BRKi, RUNi, RUNAi
Computer Outputs --- BRK, RUN, RUNA
3- Circuit Conforms to 2.26.9.4: Yes
4-**Test 2**
Note: On the following tests, the car will verify the start condition three times before shutting down. Please allow sufficient time for the error condition to be tested all three times. The elevator status will show I/O Error when the test is complete.

Before the car completes a run in either direction, CAREFULLY hold in the BRK contactor: Place a call to another landing. Observe that the car shuts down at the landing with an I/O Error and does not restart. To restore the car to normal operation, release the BRK contactor, move the controller inspection switch to the INS position and then back to AUTO.

While the car is stopped at a landing, **CAREFULLY** jump terminal "CS" to terminal "DON" or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST1. Place a call to another landing. Observe that the car shuts down at the landing with an I/O Error and does not restart. To restore the car to normal operation, move the controller inspection switch to the INS position and then back to AUTO.

While the car is stopped at a landing, **CAREFULLY** jump terminal "CS" to terminal "BRK" or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST2. Place a call to another landing. Observe that the car shuts down at the landing with an I/O Error and does not restart. To restore the car to normal operation, move the controller inspection switch to the INS position and then back to AUTO.

Before the car completes a run in either direction, CAREFULLY hold in the RUN contactor: Place a call to another landing. Observe that the car shuts down at the landing with an I/O Error and does not restart. To restore the car to normal operation, release the RUN contactor, move the controller inspection switch to the INS position and then back to AUTO.

While the car is stopped at a landing, **CAREFULLY** jump terminal "CS" to terminal "RUNA" or if test points are supplied on the GALX-1038N board or GALX-1064N, jump test point TST3. Place a call to another landing. Observe that the car shuts down at the landing with an I/O Error and does not restart. To restore the car to normal operation, move the controller inspection switch to the INS position and then back to AUTO.

Relays:

1-Critical Components: GR1, GR2, DZ, DZ1
2-Redundant Components Computer Inputs --- GRT1, GRT2
Computer Outputs --- GR1, GR2
3- Circuit Conforms to 2.26.9.4: Yes
4-**Test 3**
While the car is stopped at a landing, **CAREFULLY** remove the wire from the "GOV" terminal or open the Governor Switch manually. Observe that the GR1 and the GR2 Relays de-energize and the Rope Gripper or Emergency Brake has set. To restore the car to normal operation, replace the wire in the "GOV" terminal or reset the Governor Switch. Place the car on inspection. On the GALX1021 board use the up or down buttons to access the "Elevator Setup" menu. Use the Up or Down buttons to access the "Reset Rope Gripper" menu. Press and hold the Enter button for 10 seconds. Place the car back on automatic mode.

Before the car completes a run in either direction, hold in the GR1 relay. Observe that the car shuts down at the landing with an I/O Error, "GRT1 input on fault" and does not restart. To restore the car to normal operation, release the GR1 relay. Place the car on inspection. Place the car back on automatic mode.

Before the car completes a run in either direction, hold in the GR2 relay. Observe that the car shuts down at the landing with an I/O Error, "GRT1 input on fault" and does not restart. To restore the car to normal operation, release the GR2 relay. Place the car on inspection. Place the car back on automatic mode.

Before the car leaves the floor for a run in either direction, hold in the DZ relay. The detection of the DZ relay dropping out is done while the car is out of the door zone. Observe that the car shuts down after arriving at the next landing with an I/O Error, "GRT2 input on fault" and does not restart. To restore the car to normal operation, release the DZ relay. Place the car on inspection. Place the car back on automatic mode.

Before the car leaves the floor for a run in either direction, hold in the DZ1 relay. The detection of the DZ relay dropping out is done while the car is out of the door zone. Observe that the car shuts down after arriving at the next landing with an I/O Error, "GRT2 input on fault" and does not restart. To restore the car to normal operation, release the DZ1 relay. Place the car on inspection. Place the car back on automatic mode.

1.2 Solid State Devices

Up and Down Outputs:

1-Critical Components: Computer Outputs --- UP, DNR
2-Redundant Components: Computer Inputs --- UPi, DNRi
3-Circuit Conforms to 2.26.9.4: Yes
4-**Test 4**
While the car is stopped at a landing, **CAREFULLY** jump terminal "RND" to terminal "UP". Place a call to another landing. Observe that the car shuts down and does not restart. To restore the car to normal operation, move the controller inspection switch to the inspection position, wait ten seconds, then place the controller inspection switch into the auto position.

While the car is stopped at a landing, **CAREFULLY** jump terminal "RND" to terminal "DNR". Place a call to another landing. Observe that the car shuts down and does not restart. To restore the car to normal operation, move the controller inspection switch to the inspection position, wait ten seconds, then place the controller inspection switch into the auto position.
Automatic / Inspection Mode Inputs:

1-Critical Components: Computer Inputs --- AUTO, INS, ACC, MRI, ICI
2-Redundant Components: Computer Inputs --- AUTO, INS, ACC, MRI, ICI

3-Circuit Conforms to 2.26.9.4: Yes

Note: Only one of these inputs can be on at one time, and one of these inputs must be on all the time. If none of these inputs is on a fault occurs. If more than one of these inputs is on at the same time a fault occurs. Three separate means (Safety PIC Processor, Safety PAL, and Main Processor) detect the fault and shut down the car.

B4-**Test 5**
While the car is stopped at a landing on Automatic service, **CAREFULLY** remove the wire from terminal "ICA" (in car automatic). Observe that the car shuts down on an inspection fault and does not restart. Observe that the "PAL INHIBIT" led turns on. Observe that the "PIC INHIBIT" led turns on. To restore the car to normal operation, put the wire back into the "ICA" terminal.

While the car is stopped at a landing on Automatic service, **CAREFULLY** jump terminal "SS" to terminal "INS" (car top inspection). Observe that the car shuts down on an inspection fault and does not restart. Observe that the "PAL INHIBIT" led turns on. Observe that the "PIC INHIBIT" led turns on. To restore the car to normal operation, remove the jumper.

While the car is stopped at a landing on Automatic service, **CAREFULLY** jump terminal "SS" to terminal "ACC" (Access). Observe that the car shuts down on an inspection fault and does not restart. Observe that the "PAL INHIBIT" led turns on. Observe that the "PIC INHIBIT" led turns on. To restore the car to normal operation, remove the jumper.

While the car is stopped at a landing on Automatic service, **CAREFULLY** jump terminal "SS" to terminal "ICI" (in car inspection). Observe that the car shuts down on an inspection fault and does not restart. Observe that the "PAL INHIBIT" led turns on. Observe that the "PIC INHIBIT" led turns on. To restore the car to normal operation, remove the jumper.

<u>Door Lock Circuit and Car Gate Switch Contact Inputs</u>:

1-Critical Components:	Computer Inputs ---	DLT, DLM, DLB, RLM, GS1, RGS, LBP, GBP
2-Redundant Components:	Computer Inputs ---	DLT-1, DLM-1, DLB-1, GS-1, RLM-1, RGS-1

3-Circuit Conforms to 2.26.9.4: Yes
4-**Test 6**
Before the car completes a run to the top floor, **CAREFULLY** jump Pin 12 and Pin 11 on Chip U6 on GALX1038N board or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST6. This jumps out the "DLT" (door lock top Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, DLT DLT-1 Opposite Fault and Top Door Lock Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

Before the car completes a run to the top floor, **CAREFULLY** jump Pin 12 and Pin 11 on Chip U7 on GALX1038N board or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST7. This jumps out the "DLT-1" (door lock top Aux Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, DLT DLT-1 Opposite Fault and Top Door Lock Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

Before the car completes a run to a middle floor, **CAREFULLY** jump Pin 14 and Pin 13 on Chip U6 on GALX1038N board or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST8. This jumps out the "DLM" (door lock middle Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, DLM DLM-1 Opposite Fault and Mid Door Lock Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

Before the car completes a run to a middle floor, **CAREFULLY** jump Pin 14 and Pin 13 on Chip U7 on GALX1038N board or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST9. This jumps out the "DLM-1" (door lock middle aux Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, DLM DLM-1 Opposite Fault and Mid Door Lock Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

Before the car completes a run to the bottom floor, **CAREFULLY** jump Pin 16 and Pin 15 on Chip U6 on GALX1038N board or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST10. This jumps out the "DLB" (door lock bottom Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, DLB DLB-1 Opposite Fault and Bot Door Lock Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

Before the car completes a run to the bottom floor, **CAREFULLY** jump Pin 16 and Pin 15 on Chip U7 on GALX1038N board or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST11. This jumps out the "DLB-1" (door lock bottom aux Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, DLB DLB-1 Opposite Fault and Bot Door Lock Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

Before the car completes a run to any floor, **CAREFULLY** jump Pin 16 and Pin 15 on Chip U21 on GALX1038N board or if test points are supplied on the GALX-1028N or GALX-1066N (Safety Processor) board, jump test point TST12. This jumps out the "GS" (gate switch Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, GS GS-1 Opposite Fault and Gate Switch

Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

Before the car completes a run to any floor, **CAREFULLY** jump Pin 14 and Pin 13 on Chip U21 on GALX1038N board or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST13. This jumps out the "GS-1" (gate switch aux Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, GS GS-1 Opposite Fault and Gate Switch Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

While the car is stopped at a landing on Automatic service, move the door lock bypass switch to the bypass position. Observe that the car shuts down on a door lock by pass fault and does not restart. Observe that the "PAL INHIBIT" led turns on. Observe that the "PIC INHIBIT" led turns on. To restore the car to normal operation, move the door lock bypass switch to the open position.

While the car is stopped at a landing on Automatic service, move the car gate bypass switch to the bypass position. Observe that the car shuts down on a car gate by pass fault and does not restart. Observe that the "PAL INHIBIT" led turns on. Observe that the "PIC INHIBIT" led turns on. To restore the car to normal operation, move the car gate bypass switch to the open position.

<u>For Rear Floors if Applicable</u>:
Before the car completes a run to a rear call on a middle floor, **CAREFULLY** jump Pin 10 and Pin 9 on Chip U6 on GALX1038N board or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST14. This jumps out the "RLM" (rear door lock middle Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, RLM RLM-1 Opposite Fault and Rear Mid Lock Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

Before the car completes a run to a rear call on a middle floor, **CAREFULLY** jump Pin 10 and Pin 9 on Chip U7 on GALX1038N board or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST15. This jumps out the "RLM-1" (rear door lock middle aux Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, RLM RLM-1 Opposite Fault and Rear Mid Lock Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.
<u>For Rear Floors if Applicable</u>:
Before the car completes a run to a rear call, **CAREFULLY** jump Pin 16 and Pin 15 on Chip U33 on GALX1038N board or if test points are supplied on the GALX-1028N or GALX-1066N (Safety Processor) board, jump test point TST16. This jumps out the "RGS" (rear gate switch Input). Observe that the car stops opens the doors then shuts

down and does not restart. Two faults will occur, RGS RGS-1 Opposite Fault and Rear Gate Sw Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

Before the car completes a run to a rear call, **CAREFULLY** jump Pin 14 and Pin 13 on Chip U33 on GALX1038N board or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST17. This jumps out the "RGS-1" (rear gate switch aux Input). Observe that the car stops opens the doors then shuts down and does not restart. Two faults will occur, RGS RGS-1 Opposite Fault and Rear Gate Sw Fault. The status will show I/O Error. To restore the car to normal operation, remove the jumper, place the car on Inspection mode and return the car to automatic mode.

<u>In Car Stop Switch Bypass:</u>

1-Critical Components: FST
2- Redundant Components: FSTi, FST1
3-Circuit Conforms to 2.26.9.4: Yes
4-**Test 7**
While the car is stopped at a landing on Automatic service **CAREFULLY** jump terminal "SFC" to pin #11 on the FST output chip #U63 or if test points are supplied on the GALX-1038N or GALX-1064N board, jump test point TST18. Place a call to another landing. Observe that the car shuts down and does not restart. To restore the car to normal operation, remove the jumper, move the controller inspection switch to the INS position and then back to AUTO.

<u>Computer Hardware</u>:

1-Critical Components: Safety PAL on GALX-1028N Board
PIC Processor on GALX-1028N Board
GALX-0028N Main Processor
2-Redundant Components: Safety PAL on GALX-1028N Board
PIC Processor on GALX-1028N Board,
GALX- 0028N Main Processor
3-Circuit Conforms to 2.26.9.4: Yes

4-**Test 8**
While the car is stopped at a landing on Automatic service, remove connector "CAN BUS (CANL/CANH)". Observe the car shuts down on a Safety Processor Communication fault and does not restart. To restore the car to normal operation, replace connector "CAN BUS (CANL/CANH)".

1-Critical Components: Watchdog Timer
2-Redundant Components: Galaxy Elevator Software
3-Circuit Conforms to 2.26.9.4: Yes
4-**Test 9**

Put the car on inspection. Push the Up button on the GALX1021 board to scroll through the menu until "Software Version" is on the screen. Press the enter button. Press the Up button until "Test Watchdog Reset" is on the screen. Press the enter button twice. Observe the LED on the Microprocessor board will stop blinking. After a few seconds the Galaxy power up message should appear on the LCD screen. This test stops petting the watchdog timer, which causes the timer to reset the microprocessor and turn off all outputs. This simulates what would happen if the software system stopped functioning.

1.3 Software System:

1-Critical Components: Galaxy Elevator Software
2-Redundant Components: Watchdog Timer
3-Circuit Conforms to 2.26.9.4: Yes
4-**Test 10**

1.4 Levelling Limits:

1-Critical Components: Selector DZ output
2-Redundant Components: Selector DZA output
Computer Input --- DZ, DZA
3-Circuit Conforms to 2.26.9.4: Yes
4-**Test 11**
While the car is stopped at a landing, **CAREFULLY** jump terminal "S10" to terminal "DZ" (door zone). Place a call to another landing. Observe that the when the car stops at the next landing and opens the doors, that it shuts down on a door zone fault and does not restart. To restore the car to normal operation, remove the jumper. Place the car on inspection for 10 seconds, and then put the car back onto normal operation.

1.5 Single Ground:

1-Redundant Components: Fuse L1 & Fuse S10
2-Circuit Conforms to 2.26.9.4: Yes
3-**Test 12**
With the "safety string" closed, short terminal "SS" to terminal "GND". Observe that the S10 (and/or L1) fuse clears, and the car will not restart. Replace cleared fuse.

With the doors closed and locked, short terminal "DLM" to terminal "GND". Observe that the S10 (and/or L1) fuse clears, and the car will not restart. Replace cleared fuse.

2. If Contactors/Relays are used to meet 2.26.8.2 or 2.26.9.3 to 2.26.9.7 & if used for MONITORING Purposes [see2.26.3]- Identify below

2.1-Driving M/C Brake (2.26.8.2)

	Identification	Manufacturer Model
MC	Motor Contactor	ABB Contactor (DA75-21A-11-84) ABB Contactor (EHDB130C-IL to EHDB360C-IL) or certified equivalent.
BRK	Brake Contactor	ABB Contactor (A16-30-10-84 to A210-30-10-84) or certified equivalent.
RUN	Run Contactor	ABB Contactor (A16-30-10-84 to A210-30-10-84) or certified equivalent.

2.2-Critical Circuits (2.26.9.3)

No relays used for monitoring purposes.

2.3-Redundency Checking (2.26.9.4)

No relays used for monitoring purposes.

2.4-Static Motor Control(2.26.9.5, 2.26.9.6)

	Identification	Manufacturer Model
MC	Motor Contactor	ABB Contactor (DA75-21A-11-84) ABB Contactor (EHDB130C-IL to EHDB360C-IL) or certified equivalent.

3. Additional Protection for Static Motion Drive Control [2.26.9.5 &2.23.9.6]-Identify below

3.1 -Two devices/means provided to remove inhibit power [2.26.9.5.1/2.26.9.6.1)

1) MC Contactor by ABB or certified equivalent.
2) DSD412 SCR drive by Magnetek

3.2-Contactor / Relay that causes driving machine brake to open [2.26.9.5.3 / 2.26.9.6.4)

1) BRK Contactor by ABB or certified equivalent.

3.3-Additional contactor to open driving machine brake [2.26.9.5.3/2.26.9.6.4)

1) RUN Contactor by ABB or certified equivalent.

4. Ascending Car Overspeed Detection Means

4.1-Identify the detection method used:

1) Governor overspeed switch, device meets 2.26.4.3
2) Main processor on GALX-0028N Board (Uses encoder mounted to motor for feedback). Detection means meet the requirements of 2.19.2.2(a)(1)(b).

4.2 - Unintended Movement Detection Means

Identify the detection method used:

1) PIC processor on GALX-1028N Board (Uses holes in Selector tape for feedback). Detects unintended car movement away from the landing with open door circuits. Detection means meet the requirements of 2.19.2.2(a)(1)(b).
2) Main processor on GALX-0028N Board (Uses encoder mounted to motor for feedback). Detects unintended car movement away from the landing with open door circuits. Detection means meet the requirements of 2.19.2.2(a)(1)(b).

5. Conformance / Test Procedures required for Electrical Equipment – Indicate / Demonstrate:

5.1) The car will not revert to normal operation[2.26.9.3(d) When on:

1 - Bypass
2 - Access
3 - Inspection
Note: Three separate means; Safety PAL (discrete logic), Safety PIC Processor (software means), and Main Processor (software means) detect the fault and shut down the car. Test 6 demonstrates how to test.

5.2) The door interlocks & contacts will return to effectivness[2.26.9.3(e)] when these switches are turned off:

1 - Bypass
2 - Access
Note: Three separate means; Safety PAL (discrete logic), Safety PIC Processor (software means), and Main Processor (software means) detect the fault and shut down the car.

5.3) Bypass circuits (if any) meet 2.26.9.3 & .4 (redundancy checking) per 2.26.1.5.3:

1 - Bypass
Note: Three separate means; Safety PAL (discrete logic), Safety PIC Processor (software means), and Main Processor (software means) detect the fault and shut down the car.

6. ETSLD

That the sensing device of ETSLD [2.25.4.1] is independent of the normal speed control system, per 2.25.4.1.2:
Note: The ETSLD is only required when reduced–stroke buffers are used. If this is not the case, skip this test.

Note 1:
The normal speed control system uses a velocity encoder mounted on the governor shaft or motor encoder or perforated tape, which feeds back the speed information to the main processor on the GALX-0028N or GALX-1100AN board, to ensure proper motion of the car. Mechanical or magnetic limit switches are arranged at the terminal limits. Speed and position of the elevator is checked whenever one of these mechanical or magnetic switches open. If the car is not at the correct position or speed when the switch opens the car does an emergency slowdown. The switch position is also verified, after every run into a terminal landing, and if the switch doesn't open the car does an emergency slowdown.

The speed reference used for the ETSLD comes from a second encoder on the governor shaft, motor encoder or an inductive proximity sensor on the selector. The Safety PIC and PAL processor reads the encoder feedback from the governor encoder, motor encoder or an inductive proximity sensor on the selector and position of the emergency terminal stopping switches mounted in the hoist-way. If a fault is detected power is removed from the driving-machine motor and the brake. Separate devices (PIC and PAL), separate hoist-way switches, and separate speed feedback are used to ensure that the sensing device of ETSLD [2.25.4.1] is independent of the normal speed control system, per 2.25.4.1.2. The following tests will verify each emergency terminal limit switch independently. DTS/UTS are monitored by the PIC on the safety processor board and DTS2/UTS2 is monitored by the PAL on the safety processor board. Each device (PIC and PAL) can independently remove power to the brake and machine.

Testing "DTS/DTS2" Down Emergency Terminal Switches (ETSLD):

1) Bottom emergency terminal test, jump the bottom normal terminal slowdown limit switches DT, DT1, DT2, DT3, etc. depending on how many normal slowdown switches the job has to SS (110VAC). Also jump DTS2 on the safety processor board to SS (110VAC). Refer to the job schematics specific terminal wiring locations.

2) From the Controller's LCD display, select the "Elevator Setup" menu and then select "Car Buffer Test" to perform a bottom emergency terminal limit test.

3) Turn off the automatic door switch. To execute the test, the car must be level at the floor and on automatic operation.

4) The test also cannot be started from a terminal landing. If the car is at a terminal landing, the LCD display will show "To position the car press Enter". Pressing "Enter" will place a car call in the middle of the hoist-way. If the car is already positioned properly for the run, the display will give the option to position the car or the skip to the next step.

5) Once the car is located in the correct starting position, select “Run Buffer Test”. When the “Enter” button is pressed, the car’s position will be modified internally to the top of the hoist-way for a car buffer test. The car will then run once at high speed to the appropriate limit.

6) While the car is in motion, the LCD display will change to “Press Enter Button to Cancel Buffer Test”. Pressing the “Enter” button will cause the car to execute an emergency slowdown.

7) Observe that when the DTS switch is activated the car does an emergency stop (removes power from the brake and machine). After the car stops the car will then move to a floor.

8) Repeat tests 2 through 7 to test DTS2 by removing the jumper for DTS2 on the safety processor board and jump DTS on the GALX-1064AN board to SS (110VAC). In step 7 above, observe that when the DTS2 switch is activated the car does an emergency stop (removed power form the brake and machine). After the car stops the car will then move to a floor.

9) **After the test is complete remove all jumpers**.

Testing “UTS/UTS2” Up Emergency Terminal Switch (ETSLD):

1) Top emergency terminal switch test, jump the top normal terminal slowdown limit switches UT, UT1, UT2, UT3 depending on how many normal slowdown switches the job has to SFC (110VAC). Also jump UTS2 on the safety processor board to SS (110VAC). Refer to the job schematics specific terminal wiring locations.

2) From the Controller’s LCD display, select the “Elevator Setup” menu and then select “Counterweight Buffer Test” to perform a top emergency terminal limit test.

3) Turn off the automatic door switch. To execute the test, the car must be level at the floor and on automatic operation.

4) The test also cannot be started from a terminal landing. If the car is at a terminal landing, the LCD display will show “To position the car press Enter”. Pressing “Enter” will place a car call in the middle of the hoist-way. If the car is already positioned properly for the run, the display will give the option to position the car or the skip to the next step.

5) Once the car is located in the correct starting position, select “Run Buffer Test”. When the “Enter” button is pressed, the car’s position will be modified internally to the bottom of the hoist-way for a counterweight buffer test. The car will then run once at high speed to the appropriate limit.

6) While the car is in motion, the LCD display will change to "Press Enter Button to Cancel Buffer Test". Pressing the "Enter" button will cause the car to execute an emergency slowdown.

7) Observe that when the UTS switch is activated the car does an emergency stop (removes power from the brake and machine). After the car stops the car will then move to a floor.

8) Repeat tests 2 through 7 for testing UTS2 by removing the jumper for UTS2 on the safety processor board and jump UTS on the GALX-1064AN board to SS (110VAC). In step 7 above, observe that when the UTS2 switch is activated the car does an emergency stop (removed power form the brake and machine). After the car stops the car will then move to a floor.

9) **After the test is complete remove all jumpers**.

The following test will verify 2.25.4.1.9 where magnetically operated, optical, or solid-state devices are used for positon sensing, a single circuit caused by a combination of grounds or by other conditions, or the failure of any single magnetic operated, optical, or solid-state device shall not permit the car to restart after a normal stop.

1) Place the car in the middle of the hoist-way with the doors disabled.
2) Place a jumper from UTS to SS on the GALX-1064AN board. This will simulate a shorted UTS limit switch.
3) Place a car call to the top floor.
4) After the car comes to a normal stop at the top floor verify that the car does not restart.
5) Repeat steps 1 through 4 above except remove the jumper from UTS to SS and place a jumper from UTS2 to SS on the GALX-1066AN board. This will simulate a shorted UTS2 limit switch.
6) Place a jumper from DTS to SS on the GALX-1065AN board. This will simulate a shorted DTS limit switch.
7) Place a car call to the bottom floor.
8) After the car comes to a normal stop at the bottom floor verify that the car does not restart.
9) Repeat steps 6 through 9 above except remove the jumper from DTS to SS and place a jumper from DTS2 to SS on the GALX-1066AN board. This will simulate a shorted DTS2 limit switch.

After the test is complete remove all jumpers.

7. ETSD

That ETSD[2.25.4.2] will cause power to be removed from driving M/C and brake if NSM and NTSD fail to slow car down at a terminal:

Note: Emergency Terminal Stopping Devices are only required on elevators with static control and rated speeds over 1 m/s (200 ft/min). If the job utilizes ETSLD then skip this test.

Note 1:
The normal speed control system uses a velocity encoder mounted on the motor shaft or governor encoder, which feeds back the speed information to the drive and Main Processor on the GALX-0028n board, to ensure proper motion of the car. Mechanical or magnetic limit switches are arranged at the terminal limits. Speed and position of the elevator is checked whenever one of these mechanical or magnetic switches open. If the car is not at the correct position or speed when the switch opens the car does an emergency slowdown. The switch position is also verified, after every run into a terminal landing, and if the switch doesn't open the car does an emergency slowdown and will prevent the elevator from running until the fault is cleared.

The speed feedback used for the ETSD comes from an Inductive Proximity sensor on the selector or from an encoder mounted on the governor or motor. The Safety PIC processor and the safety PAL (FPGA) device reads the sensor or encoder and position of the emergency terminal stopping switches mounted in the hoist-way. If a fault is detected the safety PIC processor and the safety PAL device removes power from the driving-machine motor and the brake. A separate microprocessor (PIC) and PAL (FPGA) device, separate hoist-way switches, and separate speed feedback are used to ensure that the sensing device of is independent of the normal speed control system.

Testing "DTS" Down Emergency Terminal Switch (ETSD):

10) Bottom emergency terminal test, jump the bottom normal terminal slowdown limit switches DT, DT1, DT2, DT3 depending on how many normal slowdown switches the job has to SFC (110VAC). Refer to the job schematics specific terminal wiring locations.

11) From the Controller's LCD display, select the "Elevator Setup" menu and then select "Car Buffer Test" to perform a bottom emergency terminal limit test.

12) Turn off the automatic door switch. To execute the test, the car must be level at the floor and on automatic operation.

13) The test also cannot be started from a terminal landing. If the car is at a terminal landing, the LCD display will show "To position the car press Enter". Pressing "Enter" will place a car call in the middle of the hoistway. If the car is already positioned properly for the run, the display will give the option to position the car or the skip to the next step.

14) Once the car is located in the correct starting position, select "Run Buffer Test". When the "Enter" button is pressed, the car's position will be modified

internally to the top of the hoistway for a car buffer test. The car will then run once at high speed to the appropriate limit.

15) While the car is in motion, the LCD display will change to "Press Enter Button to Cancel Buffer Test". Pressing the "Enter" button will cause the car to execute an emergency slowdown.

16) Observe that when the DTS switch is activated the car does an emergency stop (removes power from the brake and machine). After the car stops (for the "Fault Time" set in the Field Variables-Car Timers menu) the car will then move to a floor.

17) **After the test is complete remove all jumpers**.

Testing "UTS" Up Emergency Terminal Switch (ETSD):

10) Top emergency terminal switch test, jump the top normal terminal slowdown limit switches UT, UT1, UT2, UT3 depending on how many normal slowdown switches the job has to SFC (110VAC). Refer to the job schematics specific terminal wiring locations.

11) From the Controller's LCD display, select the "Elevator Setup" menu and then select "Counterweight Buffer Test" to perform a top emergency terminal limit test.

12) Turn off the automatic door switch. To execute the test, the car must be level at the floor and on automatic operation.

13) The test also cannot be started from a terminal landing. If the car is at a terminal landing, the LCD display will show "To position the car press Enter". Pressing "Enter" will place a car call in the middle of the hoistway. If the car is already positioned properly for the run, the display will give the option to position the car or the skip to the next step.

14) Once the car is located in the correct starting position, select "Run Buffer Test". When the "Enter" button is pressed, the car's position will be modified internally to the top of the hoistway for a car buffer test or to the bottom of the hoistway for a counterweight buffer test. The car will then run once at high speed to the appropriate limit.

15) While the car is in motion, the LCD display will change to "Press Enter Button to Cancel Buffer Test". Pressing the "Enter" button will cause the car to execute an emergency slowdown.

16) Observe that when the UTS switch is activated the car does an emergency stop (removes power from the brake and machine). After the car stops (for the "Fault Time" set in the Field Variables-Car Timers menu) the car will then move to a floor.

17) **After the test is complete remove all jumpers**.

Verify that the version number and the checksum number on the PAL device on the GALX-1066AN board, safety processor board matches the version number and checksum number on the job's attestation sheet.

8. Motor Field Sensing

That motor field sensing protection functions per 2.26.2.4

With the elevator stopped. Pull the main line switch (on large DC Gearless machines if you do not pull the main line a large arc may occur). Remove the wire from the F1 terminal. Restore the main line switch to the closed position. Observe that the car is shut down on fault 905 Field Loss Fault and does not restart. Pull the main line switch. Replace the wire in the F1 terminal. Restore the main line switch to the closed position.

9. NTSD

That the NTSD [2.25.2] function independently of operation of normal stopping means and ETSD per 2.25.2.1.2

1) Put the car on inspection, which will render the normal elevator stopping means inoperative.
2) Remove wire from the UN terminal.
3) Verify that the car will move down and not up.
4) Replace the wire in the UN terminal.
5) Remove wire from the DN terminal.
6) Verify that the car will move up and not down.
7) Replace the wire in the DN terminal.
8) Remove the car from inspection.

For this test only adjust parameters UT Vel and DT Vel on the Safety Processor Board to contract speed. Also on the GALX-1021 board under Elevator Set-up adjust all the normal terminal slowdown speed clamps to contract speed. This will verify that the GALX-0320AN (NTSD board) will slow down the car to the nearest terminal landing.

Testing "DT" Down Terminal Slowdown Switch (NTSD):

For application where DTS and UTS are not required, DTS is jumped to DT and UTS is jumped to UT. Prior to performing the DT and UT test below, remove jumper wire from UTS and DTS and wire UTS and DTS to SFC terminal on the GALX-1064N board.

1. Bottom terminal slowdown test (DT), jump DTS terminal limit to SFC (110VAC). Refer to the job schematics for specific terminal wiring locations.

2. From the Controller's LCD display, select the "Elevator Setup" menu and then select "Car Buffer Test" to perform a bottom normal terminal slowdown test.

3. Turn off the automatic door switch. To execute the test, the car must be level at the floor and on automatic operation.

4. The test also cannot be started from a terminal landing. If the car is at a terminal landing, the LCD display will show "To position the car press Enter". Pressing "Enter" will place a car call in the middle of the hoistway. If the car is already positioned properly for the run, the display will give the option to position the car or the skip to the next step.

5. Once the car is located in the correct starting position, select "Run Buffer Test". When the "Enter" button is pressed, the car's position will be modified internally to the top of the hoistway for a car buffer test. The car will then run once at high speed to the bottom terminal limit switch.

6. While the car is in motion, the LCD display will change to "Press Enter Button to Cancel Buffer Test". Pressing the "Enter" button will cause the car to execute an emergency slowdown.

7. Observe that when the DT switch is activated that the car does an emergency slowdown and stops at a floor.

8. After the test is complete remove all jumpers.

Testing "UT" Up Terminal Slowdown Switch (NTSD):

1) Top terminal slowdown test, jump UTS terminal limit to SFC (110VAC). Refer to the job schematics for specific terminal wiring locations.

2) From the Controller's LCD display, select the "Elevator Setup" menu and then select "Counterweight Buffer Test" to perform a top terminal slowdown limit test.

3) Turn off the automatic door switch. To execute the test, the car must be level at the floor and on automatic operation.

4) The test also cannot be started from a terminal landing. If the car is at a terminal landing, the LCD display will show "To position the car press Enter". Pressing "Enter" will place a car call in the middle of the hoistway. If the car is already positioned properly for the run, the display will give the option to position the car or the skip to the next step.

5) Once the car is located in the correct starting position, select "Run Buffer Test". When the "Enter" button is pressed, the car's position will be modified

internally to the bottom of the hoistway for a counterweight buffer test. The car will then run once at high speed to the top terminal limit switch.

6) While the car is in motion, the LCD display will change to "Press Enter Button to Cancel Buffer Test". Pressing the "Enter" button will cause the car to execute an emergency slowdown.

7) Observe that when the UT switch is activated the car does an emergency slowdown and stops at a floor.

8) After the test is complete remove all jumpers.

9) For application where DTS and UTS are not required, place the wire jumper from DTS to DT and UTS to UT on the GALX-1064N board.

Adjust the UT Vel and DT Vel parameters on the Safety Processor Board back to their original values as well as the terminal speed clamps on the GALX-1021AN board under Elevator Set-up.

9. Ascending Car Overspeed Detection

That the car shall stop in compliance with 2.19.1.2(a)(3) and not restart when a fault of detection means [see D.2] occurs.

1) To simulate an overspeed condition, operate the governor mechanism by hand. To restore the car to normal operation, reset the governor overspeed switch. Put the car on inspection mode. If on the LCD Board GALX-1021N under Adjustable Variables, Car Options the GOV Grip Trip is set to a 1 then the rope gripper will reset upon reactivation of the governor overspeed switch otherwise on the LCD Board GALX-1021N push the up button to go to "Elevator Setup", push the enter button, push the up button to go to the "Reset Rope Gripper" push and hold the enter button for 10 seconds. Take the car off inspection mode.

2) To perform an overspeed test, (on the governor) the mechanic should follow the required precautions and procedures set forth in the local and national elevator codes.
    a. With the car on automatic, run the car to the bottom floor.
    b. Set the Overspeed Mult parameter 81 on the DSD-412 drive to 1.20.
        i. If the car does not overspeed from the previous setting, increase RATED MOTOR RPM in the drive (Parameter 11) to the appropriate RPM to achieve the correct overspeed amount.
    c. Set the Overspeed Test flag, parameter 80 on the DSD-412 drive to 1. This will cause the drive to run over speed for one run.
    d. On the controller main LCD interface, select "Run Overspeed Test" under the Elevator Setup menu. Follow the directions on the LCD display to make sure the automatic door switch is off and the

car is level at the floor on automatic operation. Enabling the overspeed test will prevent the CPU from detecting an overspeed condition for one run.

e. Place a car call to run the car in the up direction to perform the overspeed test.
f. Place the car on inspection operation.
g. Reset the drive RATED MOTOR RPM in the drive (Parameter 11) to contract speed RPM if the value was modified to achieve overspeed condition.
h. Reset the governor over speed switch.
i. On GALX1021N board access the “Reset Rope Gripper” Menu.
j. On GALX1021N board in the “Reset Rope Gripper” Sub menu push and hold the enter button for 10 seconds. Releasing the enter button before 10 seconds will cause the rope gripper to drop back out.
k. Inspect the elevator and counter weights.
l. Return the car to automatic operation.

3) To perform an overspeed test and to verify that the elevator will be stopped by the Rope Gripper only:
   a. With the car on automatic, run the car to the bottom floor.
   b. Place the car on inspection.
   c. Disconnect the tape feedback or governor encoder feedback on the GALX-1066N board.
   d. Mechanically or electrically pick the Service Brake so when the overspeed switch is activated the elevator will be stopped by the Rope Gripper ONLY. To pick the brake electrically hold in the BRK and RUN relay simultaneously if the job does not utilize an electronic brake board. For jobs that utilize the electronic brake board on the GALXN1021N board access the “Lift Brake On Inspect” sub menu. Then press and hold in the UP and ENTER button on the GALXN1021N board while holding in the BRK Contactor to pick the brake. After the car stops, release the MC contactor if being held. Reset the governor over speed switch.
   e. On GALX1021N board access the “Reset Rope Gripper” Menu.
   f. On GALX1021N board in the “Reset Rope Gripper” Sub menu push and hold the enter button for 10 seconds. Releasing the enter button before 10 seconds will cause the Rope Gripper to drop back out.
   g. Inspect the elevator and counter weights.
   h. Reconnect the tape feedback or governor encoder feedback on the GALX-1066N board.
   i. Return the car to automatic operation.

4) To perform an overspeed test on the Main processor on GALX-0028N Board.
   a. With the car on automatic, run the car to the bottom floor.
   b. On the controller main LCD interface, select encoder RPM.

c. Reduce the encoder RPM slightly more than 10%. The Main processor checks for speeds greater than 10%.
d. Place a call to run the car in the up direction.
e. While the car is in motion follow item 3)c to keep the service brake open.
f. The car will do an emergency stop using the Rope Gripper ONLY.
g. After the car has stopped return the encoder RPM to the normal value.
h. Place the car on inspection.
i. On GALX1021N Board access the "Reset Rope Gripper" Menu
j. On GALX1021N Board in the "Reset Rope Gripper" Sub menu, push and hold the enter button for 10 seconds. Releasing the enter button before 10 seconds will cause the Rope Gripper to drop back out.
k. Return the car to automatic operation

10. Unintended Movement detection

That the car shall stop in compliance with 2.19.2.2(a)(3) and not restart when a fault of detection means [see D.3] occurs.

1) With the doors open at bottom landing remove the field wire from the DZ terminal connection. Verify that the Rope Gripper will activate. To restore the car to normal operation, replace the wire back into the DZ terminal. Place the car on Inspection operation. On the GALXN1021N board access the "Reset Rope Gripper" sub menu. While in the "Reset Rope Gripper" submenu push and hold the enter button for 10 seconds. Releasing the enter button before 10 second will cause the rope gripper to drop back out. Then place the car back on normal operation.
2) With the doors open at a middle landing remove the field wire from the DZ terminal connection. Verify that the Rope Gripper will activate. To restore the car to normal operation, replace the wire back into the DZ terminal. Place the car on Inspection operation. On the GALXN1021N board access the "Reset Rope Gripper" sub menu. While in the "Reset Rope Gripper" submenu push and hold the enter button for 10 seconds. Releasing the enter button before 10 second will cause the Rope Gripper to drop back out. Then place the car back on normal operation.
3) With the doors open at the top landing remove the field wire from the DZ terminal connection. Verify that the Rope Gripper will activate. To restore the car to normal operation, replace the wire back into the DZ terminal. Place the car on Inspection operation. On the GALXN1021N board access the "Reset Rope Gripper" sub menu. While in the "Reset Rope Gripper" submenu push and hold the enter button for 10 seconds. Releasing the enter button before 10 second will cause the Rope Gripper to drop back out. Then place the car back on normal operation.
4) **For Rear Floors if Applicable** : With the rear doors open remove the field wire from the DZ terminal connection. Verify that the Rope Gripper will activate. To restore the car to normal operation, replace the wire back into the DZ terminal. Place the car on Inspection operation. On the GALXN1021N board access the "Reset Rope Gripper" sub menu. While in the "Reset Rope Gripper" submenu

push and hold the enter button for 10 seconds. Releasing the enter button before 10 second will cause the Rope Gripper to drop back out. Then place the car back on normal operation.

5) With an empty car, place the elevator at the bottom landing, level with the floor and the front doors open on inspection**. Make sure that someone is outside the elevator at the bottom floor to ensure that no one enters the elevator during this test**. Mechanically or electrically pick the brake. To pick the brake electrically hold in the BRK and RUN relay simultaneously if the job does not utilize an electronic brake board. For jobs that utilize the electronic brake board on the GALXN1021N board access the "Lift Brake On Inspect" sub menu. Then press and hold in the UP and ENTER button on the GALXN1021N board while holding in the BRK Contactor to pick the brake. This will cause the elevator to roll up with the doors open. Verify that the Rope Gripper or Emergency Brake will activate and stop the car. On the GALXN1021N board access the "Reset Rope Gripper" sub menu. While in the "Reset Rope Gripper" submenu push and hold the enter button for 10 seconds. Releasing the enter button before 10 second will cause the Rope Gripper to drop back out.
6) With 125% load, place the elevator at the top landing, level with the floor and the front doors open on inspection. **Make sure that someone is outside the elevator at the top floor to ensure that no one enters the elevator during this test**. Mechanically or electrically pick the brake. To pick the brake electrically hold in the BRK and RUN relay simultaneously if the job does not utilize an electronic brake board. For jobs that utilize the electronic brake board on the GALXN1021N board access the "Lift Brake On Inspect" sub menu. Then press and hold in the UP and ENTER button on the GALXN1021N board while holding in the BRK Contactor to pick the brake. This will cause the elevator to roll down with the doors open. Verify that the Rope Gripper or Emergency Brake will activate and stop the car. On the GALXN1021N board access the "Reset Rope Gripper" sub menu. While in the "Reset Rope Gripper" submenu push and hold the enter button for 10 seconds. Releasing the enter button before 10 second will cause the Rope Gripper to drop back out.
7) **For Rear Floors if Applicable** : With an empty car, place the elevator at the bottom landing, level with the floor and the rear doors open on inspection**. Make sure that someone is outside the elevator at the bottom floor to ensure that no one enters the elevator during this test**. Mechanically or electrically pick the brake. To pick the brake electrically hold in the BRK and RUN relay simultaneously if the job does not utilize an electronic brake board. For jobs that utilize the electronic brake board on the GALXN1021N board access the "Lift Brake On Inspect" sub menu. Then press and hold in the UP and ENTER button on the GALXN1021N board while holding in the BRK Contactor to pick the brake. This will cause the elevator to roll up with the doors open. Verify that the Rope Gripper will activate and stop the car. On the GALXN1021N board access the "Reset Rope Gripper" sub menu. While in the "Reset Rope Gripper" submenu push and hold the enter button for 10 seconds. Releasing the enter button before 10 second will cause the Rope Gripper to drop back out.

8) **For Rear Floors if Applicable** : With 125% load, place the elevator at the top landing, level with the floor and the rear doors open on inspection. **Make sure that someone is outside the elevator at the top floor to ensure that no one enters the elevator during this test**. Mechanically or electrically pick the brake. To pick the brake electrically hold in the BRK and RUN relay simultaneously if the job does not utilize an electronic brake board. For jobs that utilize the electronic brake board on the GALXN1021N board access the "Lift Brake On Inspect" sub menu. Then press and hold in the UP and ENTER button on the GALXN1021N board while holding in the BRK Contactor to pick the brake. This will cause the elevator to roll down with the doors open. Verify that the Rope Gripper will activate and stop the car. On the GALXN1021N board access the "Reset Rope Gripper" sub menu. While in the "Reset Rope Gripper" submenu push and hold the enter button for 10 seconds. Releasing the enter button before 10 second will cause the Rope Gripper to drop back out.

Note: Repeat the above test procedure for all modes of inspection operation applicable. When testing on hoist-way access exclude test 1, 2 and 3 above.

11. Speed in Leveling / truck zone

That the speed is limited to 0.75 m/s (150 f/m) and independent speed control means provided for elevator with static motion control [see2.26.1.6.6.].

Note: The speed reference comes from the inductive proximity sensor on the selector. The normal speed reference comes from the encoder mounted on the motor.

Check Inspection Speed

1) Place the car on inspection.
2) Change the Inspection speed parameter on the GALX-1028 safety processor board to 25 fpm.
3) Run the elevator on inspection and verify the car comes to an immediate stop when the car exceeds 25 fpm. The PAL and PIC LEDs on the GALX-1028 safety processor board will come on, if the direction button is pressed for 2 seconds the car restarts.
4) Change the Inspection speed Parameter on the GALX-1028 safety processor board back to its original setting.

Check Leveling speed limit:

1) Change the Leveling speed limit parameter on the GALX-1028 safety processor board to 0 fpm.
2) On the **GALX1021N** board under Adjustable Variables, Car Options set the Preopen Doors option to 1.
3) On the GALX-1021N board under Adjustable Variables, Car Motion set the Preopen Delay to 0.
4) Place a call to a different floor.
5) Verify that the car will come to an immediate stop. Observe that the PAL and PIC LED's on the GALX-1028 safety processor board will come on, and then it will level into the floor.

6) Change the Leveling speed limit parameter on the GALX-1028 safety processor board back to its original setting.
7) Change the Preopen Delay parameter on the GALX-1021N board under Adjustable Variables, Car Motion back to its original value.

12. Inner Landing Zone Limits

That the inner landing zone is up to 75mm (3 inches) and that the car shall not move with open doors if stopped outside the zone [see 2.26.1.6.7].

1) Run the elevator to the top floor.
    a. Run the elevator down, on inspection, outside the 3 inch door zone.
    b. Open the doors.
    c. Place the elevator on automatic service.
    d. Verify that the car will not move until the doors close.
2) Run the elevator to a middle floor.
    a. Run the elevator, on inspection, outside the 3 inch door zone.
    b. Open the doors.
    c. Place the elevator on automatic service.
    d. Verify that the car will not move until the doors close.
3) Run the elevator to the bottom floor.
    a. Run the elevator up, on inspection, outside the 3 inch door zone.
    b. Open the doors.
    c. Place the elevator on automatic service.
    d. Verify that the car will not move until the doors close.
4) If the elevator has rear doors run the elevator to the rear opening.
    a. Run the elevator on inspection outside the 3 inch door zone.
    b. Open the rear doors.
    c. Place the elevator on automatic service.
    d. Verify that the car will not move until the rear doors close.

13. Both Driving M/C Brake Contactors

Compliance with 2.26.9.5.3 or 2.26.9.6.3.

1) Place a call to another landing. While the car is running, cause the MC contactor to drop out by removing the wire from the A1 side of the MC coil. Verify that when MC drops the brake drops as well. Place the elevator on inspection. Replace the wire in the A1 side of the MC coil and restore the car to normal operation.
2) Place a call to another landing. While the car is running, cause the RUN contactor to drop out by removing the wire from the A1 side of the RUN coil. Verify that when RUN drops the brake drops as well. Place the elevator on inspection. Replace the wire in the A1 side of the RUN coil and restore the car to normal operation.
3) Place a call to another landing. While the car is running, cause the BRK contactor to drop out by removing the wire from the A1 side of the BRK coil. Verify that when BRK drops the brake drops but the car will continue to drive through the brake and will eventually cause a drive fault or will stop at the next landing and

shutdown with a "Brake Pick Fault". Place the elevator on inspection. Replace the wire in the A1 side of the BRK coil and restore the car to normal operation.

14. Phase I & II 153.20 Load-Weighing Device

With (100 or 125%) full load in car verify that the load weighing device does not interfere with Phase 1 [2.27.3.1.6] or Phase II [2.27.3.31(i)].

Where applicable, with the car on normal, automatic operation away from the designated level, simulate a full load (method varies according to device used); then activate Phase I and make sure that the car responds in accordance with Phase I requirements.

Where applicable with the car on Phase II operation, simulate a full load (method varies according to device used), and make sure that the car responds in accordance with Phase II requirements.

15. Phase II & Ground

That a ground or short circuit in electrical parts located at landing side of H/W enclosure and associated wiring will not disable Phase II operation after it is activated [2.27.3.4]

1) Determine if controller is supplying high voltage (120vac) or low voltage (24vac) to the smoke detector contacts and Phase 1 switches. If the controller is supplying high voltage, while the car is on Phase II, short to ground the HC terminal in the landing fixture. The HC fuse will clear. Verify that Phase II operation remains unaffected. If the controller is supplying low voltage, while the car is on Phase II, short to ground the FSP24 terminal in the landing fixture. The FSP24 fuse will clear. Verify that Phase II operation remains unaffected.
2) Replace HC fuse, if controller is supplying high voltage. Replace the FSP24 if controller is supplying low voltage.

16. Phase I & II 153.20 Power Off

That the elevator will find its position after power interruption and restoration, as to not be removed from Phase I or II [2.27.3.4]

1) Power off the controller while the car is on Phase I at any floor away from the designated landing. Restore power to the controller. The car will remain on Phase I and proceed to the designated level.
2) Power off the controller while the car is on Phase I at the designated landing. Restore power to the controller. The car will remain on Phase I at the designated landing.
3) Power off the controller at any floor while the car is on Phase II. Restore power to the controller. The car will remain on Phase II at that landing until the firefighter enters a call.
4) Power off the controller while the car is moving between floors and on Phase II. Restore power to the controller. The car will move to an available floor and stop. It will remain on Phase II at that landing until the firefighter enters a call.

17. 2.20.8.1 Protection Against Traction Loss

An encoder on the governor or a tape installed in the hoist-way will provide the velocity-measuring device for the suspension members and an encoder on the motor is used for the velocity measuring device for the drive sheave. The safety processor board and the

main CPU will monitor each velocity device independently. If the difference between the velocity on the safety processor board and the main CPU is exceeded by a field adjustable amount, the system will engage the rope gripper or emergency brake, preventing the elevator to move and a manual reset of the elevator controller needs to be performed.
To test the functionality of this operation, set the velocity check parameter to a lower value than normal, run the car and verify that the gripper has tripped. This test can be accomplished using the following steps.

a) Under "Adjustable Variables", "Car Options", set "Slip Vel Diff" parameter to 1. With the car on automatic at the top or bottom landing place a car call.
b) Observe that the GR1 and the GR2 relays de-energize and the Rope Gripper or Emergency Brake has set. To restore the car to normal operation, place the car on inspection. On the GALX-1021 board use the up or down buttons to access the "Elevator Setup" menu. Use the Up or Down buttons to access the "Reset Rope Gripper/Emergency Brake" menu. Press and hold the Enter button until the display indicates "Rope Gripper or Emergency Brake is Reset".
c) Under "Adjustable Variables", "Car Options", set "Slip Vel Diff" parameter back to its original value.

18. Emergency Power

Were an emergency or standby power system is provided, demonstrate conformance to 2.27.2 by simulation.

Always verify the job specific prints to determine the locations of terminals.

Where applicable, determine if controller is supplying high voltage (120vac) or low voltage (24vac) to the emergency power contacts. If the controller is supplying high voltage, simulate emergency power by jumping terminal HC to terminal EMP. If the controller is supplying low voltage, simulate emergency power by jumping terminal FSP24 to terminal EMP. Make sure that the elevator(s) complies with 2.27.2. To restore to normal operation remove jumper from EMP terminal.

19. Verification of version and checksum on PAL device of safety processor board.

Verify that the version number and the checksum number on the PAL device on the GALX-1066AN board, safety processor board is version 1.0 and 0031E88E respectively for non-ETSLD installation and version 1.01 and 002EB381 respectively for installations with ETSLD.

End of Document.

revision history: version 1.04

Added 2.20.8.1 requirement on page 22.

Reason: New 2010 code requirement.

Renumbered test procedures.

Revision history: version 1.04a

Update test procedure to include GALX-0320AN board (NTSD Board) on pages 14 through 16.

Revision history: version 1.04b

Included verification of version number and checksum on PAL device on the GALX-1066AN Safety Processor Board on page 13.

Revision history: version 2.0

Changed version number from 1.04b to 2.0 for 2010 compliance.

Revision history: version 2.1

Changed verbiage on page 1 for MC and MCA test.

Revision history: version 2.2

Revised test procedure to include testing of ETSLD function.
Included verification of version number and checksum on PAL device on the GALX-1066AN Safety Processor Board on page 25.

Revision history: version 2.3

Revised test procedure for stuck MC relay on page 1.