

MRL

Inspector's Guide



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Safety Precautions

IMPORTANT!

Read this page before any work is performed on Elevator Equipment. The procedures contained in this manual are intended for the use of qualified elevator personnel. In the interest of your personal safety and the safety of others, do not attempt any procedure that you are not qualified to perform.

All procedures must be done in accordance with the applicable rules in the latest edition of the National Electrical Code, the latest edition of ASME A17.1 and any governing local codes.

Terms in This Manual



CAUTION statements identify conditions that could result in damage to the equipment or other property if improper procedures are followed.



WARNING statements identify conditions that could result in personal injury if improper procedures are followed.

General Safety



Before applying power to the controller, check that all factory wire connections are tight on relays, contactors, fuse blocks, resistors and terminals on cards and DIN rail terminals. Connections loosened during shipment may cause damage or intermittent operation.

Other specific warnings and cautions are found where they apply and do not appear in this summary. See the *ThyssenKrupp Elevator Employees' Safety and Accident Prevention Program Manual* and the *Elevator Industry Field Employees' Safety Handbook* for electrical equipment safety information on installation and service.

Electrical Safety

All wiring must be in accordance with the National Electrical Code and be consistent with all state and local codes.

Use the Proper Fuse

To avoid fire hazards, use only a fuse of the correct type, voltage and current rating as specified in the parts list for the product.

Electrical Hazards

Electric shocks can cause personal injury or loss of life. Circuit breakers, switches and fuses may not disconnect all power to the equipment. Always refer to the wiring diagrams. Whether the AC supply is grounded or not, high voltage will be present at many points.

Printed Circuit Cards

When printed circuit cards are involved, do not remove connections or cards from the equipment while power is applied. This can damage equipment.

Always store and ship printed circuit cards in separate static bags.

Electrical Safety*(continued)***Mainline Disconnect**

Unless otherwise suggested, always Turn OFF, Lock and Tag out the mainline disconnect to remove power from elevator equipment. Refer to the ThyssenKrupp Elevator Employees' Safety and Accident Prevention Program Manual for the required procedure.

Test Equipment Safety

Always refer to manufacturers' instruction book for proper test equipment operation and adjustments.

Meggering or buzzer type continuity testers can damage electronic components. Connection of devices such as voltmeters on certain low level analog circuits may degrade electronic system performance. Always use a voltmeter with a minimum impedance of 1M Ohm/Volt. A digital voltmeter is recommended.

When Power Is On

Dangerous voltages exist at several points in some products. To avoid personal injury, do not touch exposed electrical connections or components while power is ON.

Mechanical Safety

See the ThyssenKrupp Elevator Employees' Safety and Accident Prevention Program Manual and the Elevator Industry Field Employees' Safety Handbook for mechanical equipment safety information on installation and service.

Static Protection Guidelines

IMPORTANT!

Read this page before working with electronic circuit boards.

Modern elevator control systems use a number of electronic cards to control various functions of the elevator. These cards have components that are extremely sensitive to static electricity. Damage to some electronic components will result from a rather small discharge of static.

Immediate and long-term operation of an electronic-based system depends upon the proper handling and shipping of its cards. For this reason, the factory bases warranty decisions on the guidelines below.

Handling

- Cards shipped from the factory in separate static bags must remain in the bags until time for installation
- Wear an anti-static wrist strap with ground wire. Acceptable straps may be purchased from the 3M™ Company or RadioShack Corporation.
- Cards must not be placed on any surface without adequate static protection.
- Handle cards only by their edges after discharging your body to ground. Components, traces or connectors must not be touched.
- Extra care should be used when handling individual, discrete components such as EPROMS which do not have circuit card traces and components for suppression.

Shipping

- Any card returned to the factory must be packaged in a static bag designed for the card.
- Any card returned to the factory must be packaged in a shipping carton designed for the card.
- "Peanuts" and styrofoam are unacceptable packing materials.

Note: Refer to the ThyssenKrupp Replacement Parts Catalog to order extra static bags and shipping cartons for each card.

Failure to adhere to the above guidelines will VOID the card warranty!

Arrival of Equipment

Receiving

Upon arrival of the equipment, inspect it for damage. Promptly report all visible damage to the carrier. All shipping damage claims must be filed with the carrier.

Storing

During storage in a warehouse or on the elevator job site, precautions should be taken to protect the equipment from dust, dirt, moisture and temperature extremes.

Revision Change Bars

Each revised page included in this manual will have a vertical line (change bar) to the left of the text that has been added or changed. The example at the left of this paragraph shows the size and position of the revision change bar.

Inspection Procedures

This Acceptance Testing has been developed as an aid for Inspectors, or any person(s) with the Authority Having Jurisdiction in the Inspection and Acceptance Testing of this system. It is not intended to replace any other documentation that may be used, and it is not totally inclusive of all items required for an Inspection Test. Please read this entire document. If any information is unclear, contact your local ThyssenKrupp Office.

Access and Egress Procedures

The Access and Egress Procedures that are used before entering the hoistway determine whether or not power is needed to perform the required task(s). If no power is needed, the appropriate Turn OFF, Lock, and Tag out procedures are used.

Car Top Safety

Safety precautions used when Accessing/Egressing Car Tops:

- Before opening the hoistway door, ensure that the correct hoistway has been selected and the car is at the proper floor to avoid a fall hazard.

Note: Access car tops from the top terminal landing whenever possible.

- Never access a hoistway, unless a reliable method of controlling the car has been determined.
- Locate the Emergency Stop Switch.
- Before accessing the car top, place the Stop Switch in the STOP position and confirm the proper operation.
- Locate a safe refuge area.
- Always maintain control of the hoistway doors during access/egress procedures.

Safety precautions used when working on Car Tops:

- Locate the position and counterweights of the car being accessed, as well as any other cars/counterweights in the vicinity. Take appropriate measures to avoid hazards.
- Before beginning work, check the car top for oil or grease, and clean as required.
- Verify proper operation of the Top-of-Car Inspection Operating Buttons. Where outlets are provided, use a grounded, portable light with a suitable non-conductive or use a grounded lamp guard and reflector.



DO NOT attach electrical cords on the car or counterweight ropes.

- Use the Top-of-Car Operating Device to operate the car. DO NOT use an operator in the car.
- If movement of the car is needed while on the car top, establish a firm hold on the cross-head or other parts of the car structure.



The top of the car, including the exit cover, is capable of sustaining a load of 300 pounds on any square area 2 feet on a side and 100 pounds applied at any point.



DO NOT hold onto the counterweight ropes while the car is moving.

Access and Egress Procedures

(continued)



DO NOT stand on the car top emergency access cover. It may not be able to hold total body weight.

- Fall protection is to be used when a fall hazard exists.

Note: The only exception to the above statement:

"When routine maintenance is being performed on top of complete, operational elevator cars, DO NOT use fall protection where there is a greater risk of entanglement."

- When opening hoistway doors from the car top, do so slowly, so that no one steps in from the landing thinking a car has arrived.
- Observe overhead clearances.
- Use extra care when working on car tops that are curved, domed, or located in unenclosed hoistways.
- When egressing the hoistway/car top, insure that the Stop Switch is in the STOP position, and the Inspection Switch is in the Inspection Operation position.



DO NOT turn these switches to Automatic Operation until the hoistway door interlock is open, and remains open, and the hoistway is empty.

Pit Safety

Before entering a pit, ensure that every employee is aware of the hazards. Some common hazards are:

- Recognized refuge space.
- Inadequate lighting.
- Improper access.
- Tripping hazards.
- Improper use of pit ladders.
- Moisture, water, and/or oil.
- Moving equipment.

Before entering a pit, take appropriate steps to minimize the following hazards (and any others that are identified):

- Locate the position and counterweights of the car being accessed, as well as any other cars/counterweights in the vicinity. Take appropriate measures to avoid hazards.
- Obtain control of the car.
- Identify a refuge space.
- If movement of the elevator is not needed to complete the work being performed, Turn OFF, Lock, and Tag out procedures are required.
- If notified by the building owner or representative that the pit and/or hoistway has been classified as a Permit Required Confined Space (this notification could be verbal or the pit/hoistway may be labeled), contact the appropriate person for authorization. In either case, DO NOT enter the pit/hoistway until you receive authorization.

Access and Egress Procedures

(continued)

When working in a pit, follow these safety precautions:

- Before entering the pit, test and verify the Door Lock Circuit and the Stop Switch Circuit.
- Insure that all portable lights and tools are connected through a Ground Fault (GFCI).
- Take care to protect all lighting from damage.
- DO NOT work in a pit with standing water.
- Before climbing, always examine shoes for oil/grease.
- Use both hands when working with ladders and when accessing/egressing the pit.
- Be aware of moving equipment (pump, motors, belts, and sheaves). Ensure that clothing and hands can't get caught in them.
- Avoid smoking, or the use of open flames in the pit.

Procedure Reference Material

The following procedures are provided and based on the ASME A17.2 - 2007 Guide for the Inspection of Elevators. For procedures not in this Guide, please refer to the appropriate ASME Documentation.

Acceptance Testing

Car Top Mounted Locking Device

The MRL Elevator System is equipped with a Car Top Mounted Car Locking Device.

Note: This device complies with the ASME 2005 A-17.1S MRL Code, Rule 2.7.5 - Working Areas Inside the hoistway and in the pit.

The car top locking device is an independent method of securing the car. The car top can then be used as a work platform to access overhead MRL equipment such as machines, brakes, governors, controllers, sheaves, rope shackles, and loadweighers.

Note: The car top locking device is to be used only from on top of the car, and only when the car is operating on Inspection Operation at low speed.

The car top locking device consists of a tube and housing assembly mounted to the crosshead. The tube is thoroughly engaged into a rail-mounted holding bracket (to achieve a solid dock). An electrical device on the crosshead-mounted housing assembly interrupts power to prevent command movement while the lock is actuated.



The Car Top Locking Device is designed to support the unbalanced load only, as specified in Rule 2.7.5.1.2.

While not in use, the lock electrically completes the circuit to allow normal elevator operations. The lock is also designed to prevent accidental engagement, which prevents service interruptions. A furnished warning sign conforming to the code requirement is to be mounted in the overhead working area.



The car top locking device is not intended to be used without the suspension means in place.

Inspection Procedures

1. Visually verify that the proper signage is installed prominently in the working area of the hatch in proximity to the rail mounted locking dock or on the car top in proximity to the locking device.
2. Place the car on Car Top Inspection Operation, and position the empty car away from the rail mounted locking dock.
3. Move the car top lock to the extended (Locked) position and verify that the car will not operate.
4. Return the car top lock to the retracted (unlocked) position.
5. Position the empty car at the work location where the rail mounted dock and the car top locking Device are aligned.
6. Manually engage the locking device and verify that the device engages correctly.
7. Unlock the locking device, and verify proper operation of the elevator.

Governor Pull-Through Test

Required tools:

- Dynamometer
 - 2-ton cable come-along winch
 - Installations with 3/8" Governor Rope
 - 4 - 3/8" Fist-Grip Crosby Clips
 - 10' - 3/8" Wire Rope
1. Gain access to the car top and run the car down on car top Inspection Operation.
 2. Turn OFF, Lock, and Tag out the mainline disconnect.
 3. Set the governor jaw.
 4. Attach the dynamometer to the governor rope using fist-grip clips and the appropriate wire rope.
 5. Attach one end of the come-along to the dynamometer and attach the other side to the cross-head with a suitable hoisting strap.
 6. Using the come-along winch, pull on the dynamometer until the governor rope pulls through the governor jaw and record the dynamometer.
 7. Remove the dynamometer and rigging from governor rope.
 8. Turn ON the mainline disconnect.
 9. Run the car up on Inspection Operation 10" to 24" to reset the governor.

Car Governor Overspeed Test



The OVERSPEED test, when enabled, will disable the ETSD electronic governor and the OSP overspeed protection. The car will NOT be prevented from decelerating. If the governor switch does NOT activate, the car will stop normally at the call floor. The system will automatically return to normal mode (all safety backup system enabled) after completion of the test.

1. Disconnect the doors by setting D26=1 with the Remote FAST in IMS or by placing the door disconnect switch to the ON position on the IOC card.
2. Position the car at the bottom floor.

Note: By minimizing the overspeed acceleration rate during the test, a more accurate display of the tripping speed is shown with the FLTN command.

3. Temporarily disable the safety thread system by typing the TSTSD command in the Remote FAST of IMS.

Car Governor Overspeed Test

(continued)

4. Initiate the over-speed test:
Enter the TST4 = Overspeed, Accel. Remote Fast will display "Enter Car Call to Execute Overspeed Test".

Note: In order to overspeed during TST4, press and hold the UDL button. Releasing the UDL button will reduce speed back to contract speed.



Do not press the RST button instead of the UDL button on the CPUTA card.

- **Over Speed = Governor Overspeed switch trip speed + 10 FPM.**
 - **Accel = desired acceleration rate from contract speed to trip speed.**
5. Enter a top floor car call.
 6. After the car reaches top speed, increase the car speed by pressing the UDL pushbutton on the CPUTA card.
 7. Verify that the governor switch trips at proper car speed.
- Note:** The actual trip speed may be viewed using the FLTN command. The corresponding car speed for error 1007 is the governor switch trip speed.
8. Place the car on Inspection Operation.
 9. Reset the governor electrical switch.
 - Manual Reset
 - a. Install a temporary jumper from CON12, 107 to 108 on the IOC card to by-pass the governor electrical switch.
 - b. Locate the car top as required to provide access to the car top.
 - c. Access the car top and place on Car Top Inspection Operation and run up to the top of the hoistway to access the governor electrical switch.
 - d. Reset the governor electrical switch and place the switch lever in the mid travel position.
 - e. Exit the car top and return the car top inspection switch to Normal Operation.
 - f. Remove the temporary jumper from CON12 terminals 107 to 108 on the IOC card.
 - Remote Reset using Governor Reset Solenoid (If provided)
 - a. Temporarily connect a jumper between terminals GSR2 and AC2 on the CVRT terminals in the controller.
 - b. To reset the governor electrical switch, connect a jumper momentarily between terminals GSR1 and AC1 on the CVRT terminals in the controller.

125% Rated Load Testing

1. With the car removed from service, position the car at the bottom landing and place 125% of rated load into the cab.
2. Disconnect the doors by setting D26=1 with the Remote FAST in IMS or by placing the door disconnect switch to the ON position on the IOC card.
3. Place the controller on Inspection Operation.
4. Increase the emergency brake drop delay time to 10 seconds, using the Remote FAST of IMS by making M75 = 10.
5. Monitor the Motion Diagnostic Screen in IMS. Verify that the normal brake and emergency brake are holding the load and no slippage is occurring by noting the position count.
6. Run the car up on Inspection Operation approximately 6" and stop the elevator.
7. Using input/output screen in IMS, verify that BSLM input is low and BSLE input is active for at least 10 seconds after stopping elevator. See Figure 1.



Figure 1 - Brake Switch Status

8. Monitor the Motion Diagnostic Screen in IMS and verify that the normal brake is holding the load and no slippage is occurring by monitoring the position count.
9. After verifying emergency brake holds 125% of rated load, place the controller on Normal Operation, the elevator will level down to floor level.
10. Return the M75 to 2 using the Remote FAST in IMS.
11. Turn ON the doors by setting D26 = 0 with the Remote FAST in IMS or by placing the door disconnect switch to the OFF position on the IOC card.
12. Remove the 25% overload from the cab and transfer the load to the top landing of the building or a landing located above the second landing which will allow for the elevator to achieve rated speed in the down direction.
13. Place 25% overload in the cab and disconnect the doors by setting D26 = 1 with the Remote Fast in IMS or by turning the door disconnect switch to the ON position on the IOC card.
14. Enter the second landing car call to run the car down at rated speed.
15. Verify the control system will lower 125% of rated load without over speeding.

Down Unintended Motion Test - TST5 with an Emergency Brake



CAUTION

The Unintended Motion Test when enabled will disable the ETSD electronic governor and the OSP overspeed protection. The system will automatically return to normal mode (all safety backup systems enabled) after completion of the test.



CAUTION

Make certain that the following items have been done before proceeding with the Unintended Motion Test.

- The top of the car under test has been inspected and all loose objects have been removed.
- Prior to performing this test all final cab finishes must be installed with the car properly counterweighted and the brake verified to hold 125% of rated load.
- The CPUTA has been provided with V2R0 or later generic software.

DOWN - Unintended Motion Verification Test

1. Verify the car is removed from Automatic Service.
2. Position the elevator to the second landing of the building and verify 125% of rated load is in the elevator cab.
3. Verify M75 is equal to at least a value of 1 and disconnect the doors by setting D26 = 1 with the Remote FAST in IMS or by placing the door disconnect switch on the IOC Card in the "ON" position.
4. Enter the TSTSD command on the Car Remote FAST to disable the safety thread system.
5. On the Car Remote FAST, enter TST5 = Heavy. IMS will respond "Run Unintended Motion Test? (Y/N)", then type Y for yes.
 - The drive will energize both the normal and emergency brakes.
 - The car will coast downward and drop the emergency brake. The normal brake will then drop after a time delay of 10 seconds and shutdown the controller with unintended motion errors #1698 and open SAF4 output.
 - The Remote Fast window will then display how far the car traveled before coming to a stop.
6. On the Remote FAST, type TFR to reset the controller. The controller will reset and the car will level back to the closest landing.
7. Type TSTSE on the Remote FAST to re-enable the Safety Thread System.
8. Type RFL on the Remote FAST to clear all faults.
9. If the unintended motion test does not stop the car within 48" floor level, troubleshoot and repair all components and then repeat steps 1 through 6.
10. Remove the 25% overload from the cab and place the car on Car Top Inspection Operation.

Car Safety Test

CAUTION

When enabled, the OVERSPEED test will disable the ETSD electronic governor and the OSP overspeed protection. The car will NOT be prevented from decelerating. If the governor jaws do NOT set, the car will stop normally at the call floor. The system will automatically return to normal mode (all safety backup system enabled) after completion of the test.

CAUTION

Make certain the following items have been done before proceeding with the safety test:

- Safety and governor are free of debris and rails are clean
 - All adjacent cars in the hoistway have been positioned at the TOP terminal floor and taken out of service.
 - The top of the car under test has been inspected and all loose objects have been removed.
 - The inside of the car under test has been inspected and all loose objects have been removed.
1. If the counterweight safeties have been provided, inhibit the movable jaw of the counterweight governor from engaging and prevent the counterweight safety arm from operating
 2. Verify that rated load is in the car and place the controller on Door Disconnect. Run the car to the top landing.

Notes:

- Do NOT jumper the car safety plank switch. The safety plank switch MUST be active.
- Refer to the governor nameplate to determine the car speed at which the safety jaws should set.
- 3. Install a temporary jumper from CON 12, 107 - 108 on the IOC card to by-pass governor over-speed switch.
- 4. Temporarily disable the safety thread system by typing the TSTSD command in the Remote FAST of IMS.
- 5. Initiate the over-speed test:
Enter the TST4 = Overspeed, Accel.

Note: In order to overspeed during TST4, press and hold the UDL button. Releasing the UDL button will reduce speed back to contract speed.

WARNING

Do not press the RST button instead of the UDL button on the CUPA card.

- Over Speed = Governor Overspeed switch trip speed + 10 FPM.
- Accel = desired acceleration rate from contract speed to trip speed.

Notes:

- The overspeed acceleration rate must be less than or equal to the programmed acceleration value (M39).
- In order to view the maximum velocity the elevator achieved during the test, enter 'MCV' command in the Remote FAST of IMS to display the maximum speed.

Car Safety Test*(continued)*

6. After the car reaches top speed, increase the car speed by pressing the UDL pushbutton on the CPUA card.
7. Place the car on Inspection and install a temporary jumper from 115 (CON7-2) to 116 (CON7-1) on the IOC card to by-pass car safeties.
8. Reset the car safety. Operate the car upward on inspection 10" to 24" to return the governor to the ready position.
9. Reset the governor electrical switch.
 - Manual Reset
 - a. Locate the car top as required to provide access to the car top.
 - b. Access the car top and place on Car Top Inspection Operation and run up to the top of the hoistway to access the governor electrical switch.
 - c. Reset the governor electrical switch and place the switch lever in the mid travel position.
 - d. Exit the car top and return the car top inspection switch to normal operation.
 - e. Remove the temporary jumper from CON12 terminals 107 to 108 on the IOC card.
 - Remote Reset using Governor Reset Solenoid (If provided)
 - a. Temporarily connect a jumper between terminals GSR2 and AC2 on the CVRT terminals in the controller.
 - b. To reset the governor electrical switch, connect a jumper momentarily between terminals GSR1 and AC1 on the CVRT terminals in the controller.
 - c. Remove the temporary jumper from CON12 terminals 107 to 108 on the IOC card.
10. Reset the safety plank switch, and remove the temporary jumper from 115 (CON7-2) to 116 (CON7-1) on the IOC card.
11. Verify that the car stopped within the acceptable distance.
12. If applicable, remove any devices used to temporarily prevent the counterweight governor and safeties from setting.
13. Verify there is NO damage to the car or hoistway equipment from the test.

Car Buffer Test

CAUTION

The BUFFER test, when enabled, disables the NTSD system, ETSD system, and normal limits, and prevents the car from decelerating once it reaches the programmed buffer strike speed for the given run. The system automatically returns to normal mode (all safety backup system enabled) after completion of the test.

CAUTION

Make certain the following items have been done before proceeding with the buffer test:

- All adjacent cars in the hoistway have been positioned at the TOP terminal floor and taken out of service.
 - The top of the car under test has been inspected and all loose objects have been removed.
 - The inside of the car under test has been inspected and all loose objects have been removed.
1. Verify the buffers are filled with oil.
 2. If the counterweight safeties have been provided, inhibit the movable jaw of the counterweight governor from engaging and prevent the counterweight safety arm from operating.
 3. Verify rated load is in the cab.
 4. Move the car two or more floors above the bottom terminal floor (to allow for a high-speed run).

CAUTION

The final limit **MUST NOT** be jumped out during the run into the buffer. If a full stroke of the buffer cannot be achieved, temporarily relocate the final limit switch in order to achieve full compression of the respected buffer and then return the switch to its original location after the test.

5. Install temporary jumper to AC1B to DLB (Conn 12-1) on the IOC card to by-pass the bottom normal limit.
6. Temporarily disable the safety thread system by typing the TSTSD command in the Remote FAST of IMS.
7. Enter TST3 = Buffer Strike Speed:
 - Buffer strike speed is identified on buffer name plate.
 - For reduced stroke buffers, set the buffer strike speed to the appropriate rated car strike speed. See Table 1.
 - Display "Enter car call to execute BUFFER test".

Buffer TKE Print No.	Max. Rated Buffer Strike Speed (FPM)	Nominal Stroke (Inches)
6002AH1	200	2.875
6002AF1	288	5.00
6002AF2	402	8.50
6002AF3	460	11.00
6002AF4	575	17.00

Table 1 - ThyssenKrupp Car Buffer Strike Speeds

Car Buffer Test

(continued)

8. Verify the car strikes the buffer at the correct speed.
9. Place the car on Inspection.
10. Set Inspection Speed M16 = 10.
11. Verify that the buffer is fully compressed by monitoring the position count in the Motion Diagnostic window of IMS.
12. Inspect the car and buffer for any possible damage.
13. Re-enable the Safety Thread System by typing the TSTSE command in the Remote FAST of IMS.
14. Remove the temporary jumper from ACB1 to DLB (Conn 12-1).
15. Install temporary jumper from CON 12, 108-115 on the IOC card to by-pass hoistway safety devices.
16. Run the car UP on inspection until it clears the buffer and verify that the buffer plunger returns to the fully extended position within 90 seconds.
17. Remove the temporary jumper from Terminals CON 12, 108-115 on the IOC card.
18. If applicable, remove any devices used to temporarily prevent the counterweight governor and safeties from setting.

NTSD Test - TST1 Bottom Terminal



Before running the NTSD test, verify the NTSD tables contain values, by using the TLS handheld adjustment tool:

- **NTSD_BOTTOM_EXAM**

1. Run the car to the top landing and place 125% of rated load in to cab.
2. Disconnect the doors by setting D26 = 1 with the Remote Fast in IMS or by turning the door disconnect switch to the ON position on the IOC Card.
3. Type the RFL command in the Remote Fast in IMS to reset all errors.
4. With the car at the top landing, enter the TST1 command in the Remote Fast in IMS.
5. Enter a bottom terminal landing car call.

Note: The TST command will abort the test.

6. Verify the car slows down with the NTSD system and stops on the bottom normal limit with an NTSD Error Code 981 in IMS.
7. Enter the RFL command in the Remote Fast in IMS to clear out the NTSD error code.
8. Remove all test weights from inside the elevator cab.

ETSx Test - TST2 Bottom Terminal



Before running the ETSx test, verify the ETSx tables contain values by entering the ETSB for the bottom tables.

Notes:

- The car may strike the car buffer during the testing of the ETSx system. This is allowable as long as the car speed is at or below the buffer nameplate striking speed.
 - In order to view the maximum velocity the elevator achieved during the test, enter 'MCV' command in the Remote FAST of IMS to display the maximum speed.
1. If counterweight safeties have been provided, inhibit the movable jaw of the counterweight governor from engaging and prevent the counterweight safety arm from operating.
 2. Verify no load is in cab and run the car to the top landing.
 3. Disconnect the doors by setting D26 = 1 with the Remote Fast in IMS or by turning the door disconnect switch to the ON position on the IOC Card.
 4. Reset all errors by typing the RFL command in the Remote Fast in IMS.
 5. With the car at the top landing, enter the TST2 command in the Remote Fast in IMS.
 6. Enter a bottom terminal landing car call.

Note: The TST command will abort the test.

7. Verify that the car performs an emergency stop, the motion diagnostic screen in IMS displays an ETSx Error Code 1516, and that the ETSx system has opened the safety circuit via the SAFETSX relay on the IOC card.
8. Verify that the Red E Bad LED on the CPUA card is illuminated.
9. Enter the ETSF command in the Remote Fast in IMS to view ETSx errors.
10. Enter the ETSC command in the Remote Fast in IMS twice to reset the ETSx system.
11. Enter the TFR command in the Remote Fast in IMS to reset the control system. The elevator will return to Normal Operation and level into the nearest landing.
12. If applicable, remove any devices used to temporarily prevent the counterweight governor and safeties from setting.

Up Unintended Motion Test - TST5 with an Emergency Brake



The Unintended Motion Test when enabled will disable the ETSD electronic governor and the OSP overspeed protection. The system will automatically return to normal mode (all safety backup systems enabled) after completion of the test.



Make certain that the following items have been done before proceeding with the Unintended Motion Test.

- The top of the car under test has been inspected and all loose objects have been removed.
- The inside of the car under test has been inspected and all loose objects have been removed.
- Prior to performing this test all final cab finishes must be installed with the car properly counterweighted and the brake adjusted to hold 125% of rated load.
- The CPUA has been provided with V2R0 or later generic software.

UP - Unintended Motion Verification Test (CPUA Card)

1. Remove the car from Automatic Service and position the empty car at the next-to-the-top landing.
2. Verify M75 is equal to at least a value of 1 and disconnect the doors by setting D26 = 1 with the Remote FAST in IMS or by placing the Door Disconnect Switch on the IOC Card in the "ON" position.
3. Enter the TSTSD command on the Car Remote FAST to disable the safety thread system.
4. On the Car Remote FAST, enter TST5 = EMPTY. IMS will respond "Run Unintended Motion Test? (Y/N)", then type Y for yes.
 - The drive will energize both the normal and emergency brakes.
 - The car will coast upward and drop the emergency brake. The normal brake will then drop after a time delay of 10 seconds and shut down the controller with Unintended Motion Errors #1698 and open SAF4 output.
 - The Remote Fast window will display how far the car traveled before coming to a stop.
5. On the Remote FAST, type TFR to reset the controller. The controller will reset and the car will level back to the closest landing.
6. Type TSTSE on the Remote FAST to re-enable the Safety Thread System.
7. Type RFL on the Remote FAST to clear all faults.
8. If the unintended motion test does not stop the car within 48" floor level, troubleshoot and repair all components and then repeat steps 1 through 5.

Ascending Overspeed Test TST7



The Ascending Overspeed Test when enabled will disable the ETSD electronic governor and the OSP overspeed protection. The car will NOT be prevented from decelerating. If the governor jaw or the Ascending Overspeed Device do not activate, the car will stop normally at the call floor. The system will automatically return to normal mode (all safety backup systems enabled) after completion of the test with the exception of the governor switch and/or jaw.



Make certain that the following items have been done before proceeding with the Ascending Overspeed Test.

- All adjacent cars in the hoistway have been positioned at the top terminal floor and taken out of service.
- The top and inside of the car under test has been inspected and all loose objects have been removed.

Note: On controllers with CPUA cards (6300XE1), verify that V2R0 or later Car Generic software is running.

- The Unintended Motion Test (TST5) has been completed in the Down Direction with 125% of rated load and the elevator stopped within 48" of floor level, prior to this test being performed.

Required Materials

This test requires a pendant pushbutton with a normally open contact. The device can be purchased directly from McMaster Carr.

- McMaster-Carr Part No. 6944K62 Pendant Switch With Cable
1. Disconnect the doors by setting D26 = 1 in the Remote FAST in IMS, or by placing the door disconnect switch on the IOC Card in the ON position.
 2. With the car on Door Disconnect, position the empty car to the bottom terminal landing.
 3. Turn OFF, Lock, and Tag out the mainline disconnect.
 4. Install a temporary jumper across terminals CON 12, 107-108 on the IOC card to by-pass the governor overspeed switch during the test.
 5. Temporarily connect a momentary normally open pushbutton (PTT) between terminal 128 (CON18-6) on the IOC Card and the normally open contact (24) on MC1 contactor. See Figure 2 for connection diagram.

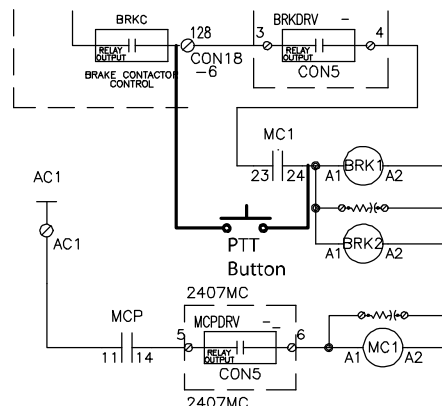


Figure 2 - Momentary Normally Open Push Button

Ascending Overspeed Test TST7

(continued)

6. Turn ON the mainline disconnect.
7. Verify the controller is on Door Disconnect.
8. Temporarily disable the Safety Thread System by typing the TSTSD command in the Remote FAST of IMS.
9. Initiate the Ascending Overspeed test by entering TST7 = Overspeed, Accel.

Note: In order to overspeed during TST7, press and hold the UDL button. Releasing the UDL button will reduce speed back to contract speed.



WARNING

Do not press the RST button instead of the UDL button on the CUPA card.

- **Over Speed = Ascending Overspeed Device activation point + 10 fpm.**
- **200 to 349 fpm activates at 125% of contract speed.**
- **350 fpm and above activates at 115% of contract speed.**
- **Accel = desired acceleration rate from contract speed to trip speed.**

10. The Remote FAST will display "Register Terminal Car Call". Enter the top floor car call.
11. As the car accelerates away from the floor, push and hold the PTT pushbutton that was connected in step 5.
12. After the car reaches top speed, increase the car speed by pressing and holding the UDL button.



WARNING

If the car does not decelerate to the rated buffer speed or the car keeps accelerating, release the PTT and UDL pushbuttons to drop the Normal Brake in order to abort the test.

13. Once the car has activated the ascending overspeed device and has stopped the car or the counterweights have struck the buffer(s) at or below the buffers rated speed, release the PTT pushbutton.
14. Verify that the ascending overspeed device activates at the proper car speed and that the car decelerated to no more than rated buffer speed or stops.

Note: The actual trip speed may be viewed by using the FLTN command. Fault 1701 (Ascending Overspeed Fault) should display with the car velocity.

15. Place the car controller on Inspection Operation.
16. Access the car top and place the car on Inspection Operation.
17. Reset the governor electrical switch and place the switch lever in the mid travel position.
18. Verify there is NO damage to the car or hoistway equipment as a result from the test.
19. Enter TFR in the Remote FAST to reset the controller and RFL to clear all faults.
20. Turn OFF, Lock, and Tag out the mainline disconnect.

Ascending Overspeed Test TST7

(continued)

21. If the Ascending Overspeed Device test does not perform correctly, troubleshoot and repair all components and then repeat steps 1 through 19.
22. Remove the temporary jumper from CON 12 terminals 107-108.
23. Remove the PTT pushbutton that was previously connected between terminal 128 (CON18-6) on the IOC Card and the normally open contact 24 on MC1 contactor.
24. Turn ON the mainline disconnect.
25. Cycle the elevator on Normal Operation at rated speed, with the doors disconnected, to verify operation.
26. After test has successfully been completed and the elevator's operation verified, continue with other testing.

Counterweight Governor Overspeed Test



When enabled, the OVERSPEED test, will disable the ETSD electronic governor and the OSP overspeed protection. The car will NOT be prevented from decelerating. If the governor switch does NOT activate, the car will stop normally at the call floor. The system will automatically return to normal mode (all safety backup system enabled) after completion of the test.

1. Disconnect the doors by setting D26=1 with the Remote FAST in IMS or by placing the door disconnect switch to the ON position on the IOC card.
2. Inhibit the moveable jaw of the car governor from engaging and prevent the car safety arm from operating.
3. Position the car at the bottom floor.

Note: By minimizing the overspeed acceleration rate during the test, a more accurate display of the tripping speed is shown with the FLTN command.

4. Temporarily disable the Safety Thread System by typing the TSTSD command in the Remote FAST of IMS.
5. Initiate the over-speed test:
 - Enter the TST4 = Overspeed, Accel. Remote Fast will display "Enter Car Call to Execute Overspeed Test".

Note: In order to overspeed during TST4, press and hold the UDL button. Releasing the UDL button will reduce speed back to contract speed.



Do not press the RST button instead of the UDL button on the CUPA card.

- **Over Speed = Governor Overspeed switch trip speed + 10 FPM.**
 - **Accel = desired acceleration rate from contract speed to trip speed.**
6. Enter a top floor car call.
 7. After the car reaches top speed, increase the car speed by pressing the UDL pushbutton on the CUPA card.
 8. Verify that the governor switch trips at proper car speed.

Note: The actual trip speed may be viewed using the FLTN command. The corresponding car speed for error 1007 is the governor switch trip speed.

Counterweight Governor Overspeed Test

(continued)

9. Place the car on Inspection Operation.
10. If not testing counterweight safeties, remove all temporary inhibitors from the car governor and safeties.
11. Reset the governor electrical switch.
 - Manual Reset
 - a. Install a temporary jumper from CON12, 107 to 108 on the IOC car to by-pass the governor electrical switch.
 - b. Locate the car top as required to provide access to the car top.
 - c. Access the car top and place on Car Top Inspection Operation and run up to the top of the hoistway to access the governor electrical switch.
 - d. Reset the governor electrical switch and place the switch lever in the mid travel position.
 - e. Exit the car top and return the car top inspection switch to Normal Operation.
 - f. Remove the temporary jumper from CON12 terminals 107 to 108 on the IOC card.
 - Remote Reset using Governor Reset Solenoid (If provided)
 - a. Temporarily connect a jumper between terminals GSR4 and AC2 on the CVRT terminals in the controller.
 - b. To reset the governor electrical switch, connect a jumper momentarily between terminals GSR3 and AC1 on the CVRT terminals in the controller.

Counterweight Safety Test

CAUTION

When enabled, the OVERSPEED test will disable the ETSD electronic governor and the OSP overspeed protection. The car will NOT be prevented from decelerating. If the governor jaws do NOT set, the car will stop normally at the call floor. The system will automatically return to normal mode (all safety backup system enabled) after completion of the test.

CAUTION

Make certain the following items have been done before proceeding with the safety test:

- The safety and governor are free of debris and rails are clean
 - All adjacent cars in the hoistway have been positioned at the TOP terminal floor and taken out of service.
 - The top of the car under test has been inspected and all loose objects have been removed.
 - The inside of the car under test has been inspected and all loose objects have been removed.
1. Inhibit the movable jaw of the car governor from engaging and prevent the car safety arm from operating.
 2. Place an empty car at the bottom landing.

CAUTION

Perform the COUNTERWEIGHT SAFETY TEST with the car in the lower portion of the hoistway. This will prevent the counterweights from bottoming out and causing damage to the ropes due to excessive friction.

3. Install a temporary jumper across terminals CON 12, 107-108 on the IOC card to by-pass the governor speed switch.
4. Temporarily disable the Safety Thread System by typing the TSTSD command in the Remote FAST of IMS.
5. Initiate the over-speed test:
 - a. Enter the TST4 = Overspeed, Accel. The Remote Fast will display "Enter Car Call xx".
 - b. Enter a top terminal floor car call.

Note: In order to overspeed during TST4, press and hold the UDL button. Releasing the UDL button will reduce speed back to contract speed.

CAUTION

Do not press the RST button instead of the UDL button on the CPU card.

- Over Speed = Counterweight Governor Mechanical switch trip speed + 10 FPM.
- Accel = desired acceleration rate from contract speed to trip speed.

Notes:

- The overspeed acceleration rate must be less than or equal to the programmed acceleration value (M39).
- In order to view the maximum velocity the elevator achieved during the test, enter MCV command in the Remote FAST of IMS to display the maximum speed.

**Counterweight
Safety Test***(continued)*

6. After the car reaches top speed, increase the car speed by pressing the UDL pushbutton on the CPUA card.
7. Place the car on Inspection Operation.
8. Reset the counterweight safety. Operate the car downward on Inspection Operation 10 to 24 inches to return the governor to the ready position.
9. Remove all temporary inhibitors from the car governor and safeties.
10. Reset the car and counterweight governor switches.
 - Manual Reset
 - a. Locate the car top as required to provide access to the car top.
 - b. Access the car top and place on car top inspection operation and run up to the top of the hoistway to access the governor electrical switch.
 - c. Reset the governor electrical switch and place the switch lever in the mid travel position.
 - d. Exit the car top and return the car top inspection switch to Normal Operation.
 - e. Remove the temporary jumper from CON12 terminals 107 to 108 on the IOC card.
 - Remote Reset using Governor Reset Solenoid (If provided)
 - a. Temporarily connect a jumper between terminals GSR4 and AC2 on the CVRT terminals in the controller.
 - b. To reset the governor electrical switch, connect a jumper momentarily between terminals GSR3 and AC1 on the CVRT terminals in the controller.
 - c. Remove the temporary jumper from CON12 terminals 107 to 108 on the IOC card.
11. Verify that the counterweight stopped within the acceptable distance.
12. Verify there is NO damage to the car or hoistway equipment from the test.

Counterweight Buffer Test



When enabled, the Counterweight Buffer Test disables the NTSD System, the ETSD System, and the normal limits. This test also prevents the car from decelerating once it reaches the programmed buffer strike speed for the given run. The system automatically returns to normal mode (all safety backup systems enabled) after completion of the test.



Make certain the following items have been done before proceeding with the Counterweight Buffer Test:

- All adjacent cars in the hoistway have been positioned at the TOP terminal floor and taken out of service
 - The top of the car under test has been inspected and all loose objects have been removed
 - The inside of the car under test has been inspected and all loose objects have been removed
1. Verify that the buffers are filled with oil.
 2. Inhibit the movable jaw of the car governor from engaging and prevent the car safety arm from operating.
 3. Verify that the car is empty, and move it two or more floors below the top terminal floor (to allow for a high-speed run).
 4. Position adjacent cars at the top terminal floor, and remove them from service.
 5. Install a temporary jumper AC1B to DLT (this will bypass the top normal limit).
 6. Enter the TSTSD command on the Car Remote FAST to disable the safety thread system.
 7. Enter TST3 = Counterweight Buffer Strike Speed: (Buffer strike speed is identified on buffer name plate.) The Remote FAST will display "Enter car call to execute BUFFER test".

Note: For reduced stroke buffers, set the buffer strike speed to the appropriate rated counterweight strike speed. See Table 2.

Buffer TKE Print No.	Max. Rated Buffer Strike Speed (FPM)	Nominal Stroke (Inches)
6002AH1	200	2.875
6002AF1	288	5.00
6002AF2	402	8.50
6002AF3	460	11.00
6002AF4	575	17.00

Table 2 - ThyssenKrupp Counterweight Buffer Strike Speeds

Counterweight Buffer Test

(continued)

8. Verify the counterweight strikes the buffer at the correct speed.
9. Place the car on Inspection.
10. Set Inspection Speed M16 = 10.
11. Verify that the buffer is fully compressed by monitoring the position count in the Motion Diagnostic window of IMS.
12. Inspect the car and buffer for any possible damage.
13. Type TSTSE on the Remote FAST to re-enable the safety thread system.
14. Remove the temporary jumper from ACB1 to DLT.
15. Install temporary jumper from CON 12, 108-115 on the IOC card to by-pass hoistway safety devices.
16. Run the car DOWN on inspection until the counterweight clears the buffer and verify that the buffer plunger returns to the fully extended position within 90 seconds.
17. Remove the temporary jumper from terminals CON 12, 108-115 on the IOC card.
18. Remove any devices used to temporarily prevent the car governor and safeties from setting.

NTSD Test - TST1 Top Terminal



Before running the NTSD test, verify the NTSD tables contain values, by using the TLS handheld adjustment tool.

- **NTSD_TOP_EXAM**

1. Disconnect the doors by setting D26 = 1 with the Remote Fast in IMS or by turning the door disconnect switch to the ON position on the IOC Card.
2. Type the RFL command in the Remote Fast in IMS to reset all errors.
3. With the car at the bottom landing, enter the TST1 command in the Remote Fast in IMS.
4. Enter a top terminal landing car call.

Note: The TST command will abort the test.

5. Verify the car slows down with the NTSD system and stops on the top normal limit with an NTSD Error Code 981 in IMS.
6. Enter the RFL command in the Remote Fast in IMS to clear out the NTSD error code.

ETSx Test - TST2 Top Terminal



Before running the ETSx test, verify the ETSx tables contain values by entering the ETST for the top table.

1. Inhibit the movable jaw of the car governor from engaging and prevent the car safety arm from operating.
2. Verify the controller is on Door Disconnect and run the car to the bottom landing.
3. Type the RFL command in the Remote Fast in IMS to reset all errors.
4. With the car at the bottom landing, enter the TST2 command in the Remote Fast in IMS.
5. Enter a top terminal landing car call.

Note: The TST command will abort the test.

6. Verify that the car performs an Emergency Stop, the Motion Diagnostic Screen in IMS displays an ETSx Error Code 1516, and that the ETSx system has opened the safety circuit via the SAFETSX relay on the IOC card.

Notes:

- The counterweight may strike the counterweight buffer during the testing of the ETSx system. This is allowable as long as the car speed is at or below the buffer nameplate striking speed.
 - In order to view the maximum velocity the elevator achieved during the test, enter 'MCV' command in the Remote FAST of IMS to display the maximum speed.
7. Verify that the Red E Bad LED on the CUPA card is illuminated.
 8. Enter the ETSC command in the Remote Fast in IMS twice to reset the ETSx system.
 9. Enter the TFR command in the Remote Fast in IMS to reset the control system.
 10. The elevator will return to Normal Operation and level into the top landing.
 11. Enter the RFL command in the Remote Fast in IMS to clear out the ETSx error code.
 12. Remove any devices used to inhibit the car governor and safeties.

Rope Monitoring System Test (VK-Omega)

Confirm that AL-C, AL-S and Aux LED's on EMCO control unit are ON.

Differential Tension Test

Note: Complete the *Rope Tension Monitor Inspection Checklist* during this test.

1. Verify that the car will run on car top inspection.
2. Remove sensor #1 from the rope.
3. Confirm that Aux LED turns OFF.
4. The display will flash SE-1, indicating the sensor number that caused the unit to fault.
5. Verify that the car will not run on Car Top Inspection.
6. Re-install the sensor on the rope.
7. Confirm that Aux LED on EMCO control unit is ON.
8. Verify that the car will run on car top inspection.
9. Repeat step 1 through step 7 with the remaining sensors and ropes, verifying that when any sensor is removed, the Aux LED turns OFF and will not run on Car Top Inspection.

Minimum Load Test

Test Preparation - Remove sensors from the ropes until one less than half of the total numbers of sensors are removed. For example, if you have 6 or 5 ropes, remove 2 sensors. If you have 4 or 3 ropes, remove 1 sensor.

Note: Complete the *Rope Tension Monitor Inspection Checklist* during this test.

1. Confirm that Aux LED is OFF.
2. Remove additional sensors from the ropes until less than half of the total number of sensors are installed. With 6 or 5 ropes, 2 sensors will be installed. With 4 or 3 ropes, 1 sensor will be installed.
3. Confirm that AL-C LED turns OFF.
4. Using multimeter, confirm that AL-C contact is open.
5. Remove all of the sensors.
6. Confirm that AL-C LED remains OFF.
7. Confirm that Aux LED on EMCO control unit is ON.
8. Verify that the car will not run on car top inspection.
9. Re-install all of the sensors on the ropes.
10. Confirm that AL-C LED on EMCO control unit is ON.
11. Confirm that Aux LED on EMCO control unit is ON.
12. Verify that the car will run on car top inspection.

Rope Monitoring System Test (VK-Omega) (continued)

Rope Tension Monitor Inspection Checklist

Building Name: _____ Serial Number: _____ Inspection ID #: _____
Address: _____ City: _____ State: _____ Zip: _____

Differential Tension Test

<input type="checkbox"/> True	<input type="checkbox"/> False	AL-C, AL-S and Aux LED's on the EMCO control unit are ON .
<input type="checkbox"/> True	<input type="checkbox"/> False	The elevator will run on car top inspection.
Rope #1 Test		
Remove Sensor #1 from the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	The Aux LED on the EMCO control unit is OFF .
<input type="checkbox"/> True	<input type="checkbox"/> False	EMCO control unit display is flashing SE-1.
<input type="checkbox"/> True	<input type="checkbox"/> False	The elevator will not run on car top inspection.
Re-install the sensor on the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	Aux LED on the EMCO control unit is ON .
<input type="checkbox"/> True	<input type="checkbox"/> False	The elevator will run on car top inspection.
Rope #2 Test		
Remove Sensor #2 from the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	The Aux LED on the EMCO control unit is OFF .
<input type="checkbox"/> True	<input type="checkbox"/> False	EMCO control unit display is flashing SE-2.
<input type="checkbox"/> True	<input type="checkbox"/> False	The elevator will not run on car top inspection.
Re-install the sensor on the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	Aux LED on the EMCO control unit is ON .
Rope #3 Test		
Remove Sensor #3 from the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	The Aux LED on the EMCO control unit is OFF .
<input type="checkbox"/> True	<input type="checkbox"/> False	EMCO control unit display is flashing SE-3.
<input type="checkbox"/> True	<input type="checkbox"/> False	The elevator will not run on car top inspection.
Re-install the sensor on the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	Aux LED on the EMCO control unit is ON .
Rope #4 Test NA (Go To Minimum Load Test)		
Remove Sensor #4 from the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	The Aux LED on the EMCO control unit is OFF .
<input type="checkbox"/> True	<input type="checkbox"/> False	EMCO control unit display is flashing SE-4.
<input type="checkbox"/> True	<input type="checkbox"/> False	The elevator will not run on car top inspection.
Re-install the sensor on the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	Aux LED on the EMCO control unit is ON .
Rope #5 Test NA (Go To Minimum Load Test)		
Remove Sensor #5 from the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	The Aux LED on the EMCO control unit is OFF .
<input type="checkbox"/> True	<input type="checkbox"/> False	EMCO control unit display is flashing SE-5.
<input type="checkbox"/> True	<input type="checkbox"/> False	The elevator will not run on car top inspection.
Re-install the sensor on the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	Aux LED on EMCO control unit is ON .
Rope #6 Test NA (Go To Minimum Load Test)		
Remove Sensor #6 from the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	The Aux LED on the EMCO control unit is OFF .
<input type="checkbox"/> True	<input type="checkbox"/> False	EMCO control unit display is flashing SE-6.
<input type="checkbox"/> True	<input type="checkbox"/> False	The elevator will not run on car top inspection.
Re-install the sensor on the rope.		
<input type="checkbox"/> True	<input type="checkbox"/> False	Aux LED on the EMCO control unit is ON .

Rope Monitoring System Test (VK-Omega)

(continued)

Rope Tension Monitor Inspection Checklist (continued)

Minimum Load Test

Test Preparation		
Remove sensors from the ropes until one less than half of the total numbers of sensors are removed. For example, if you have 6 or 5 ropes, remove 2 sensors. If you have 4 or 3 ropes, remove 1 sensor.		
<input type="checkbox"/> True	<input type="checkbox"/> False	The Aux LED on the EMCO control unit is OFF .
Remove additional sensors from the ropes until less than half of the total number of sensors are installed. With 6 or 5 ropes, 2 sensors will be installed. With 4 or 3 ropes, 1 sensor will be installed.		
<input type="checkbox"/> True	<input type="checkbox"/> False	The AL-C LED on the EMCO control unit is OFF .
<input type="checkbox"/> True	<input type="checkbox"/> False	The AL-C contact on the EMCO control unit is open.
Remove all of the sensors.		
<input type="checkbox"/> True	<input type="checkbox"/> False	The AL-C LED on the EMCO control unit is OFF .
<input type="checkbox"/> True	<input type="checkbox"/> False	Aux LED on the EMCO control unit is ON .
<input type="checkbox"/> True	<input type="checkbox"/> False	The elevator will not run on car top inspection.
Re-install all of the sensors on the ropes.		
<input type="checkbox"/> True	<input type="checkbox"/> False	The AL-C LED on the EMCO control unit is ON .
<input type="checkbox"/> True	<input type="checkbox"/> False	Aux LED on the EMCO control unit is ON .
<input type="checkbox"/> True	<input type="checkbox"/> False	The elevator will run on car top inspection.

Inspectors Name

Inspector ID#

Company Name

Date

Differential Hoist Rope Tension Test (CANRTM)

1. Station an assistant in the machine room with an IMS computer connected to the elevator being tested.
2. Verify M80 is equal to 30 and M81 is equal to 40 using the Remote Fast in IMS.
3. Enter EMCE command in the Remote Fast of IMS to enable the rope tension values to be displayed with the EMCT command.
4. Enter EMCT command in the Remote Fast of IMS to display the current tension of the hoist ropes. Note the displayed values for future reference. See Figure 3.

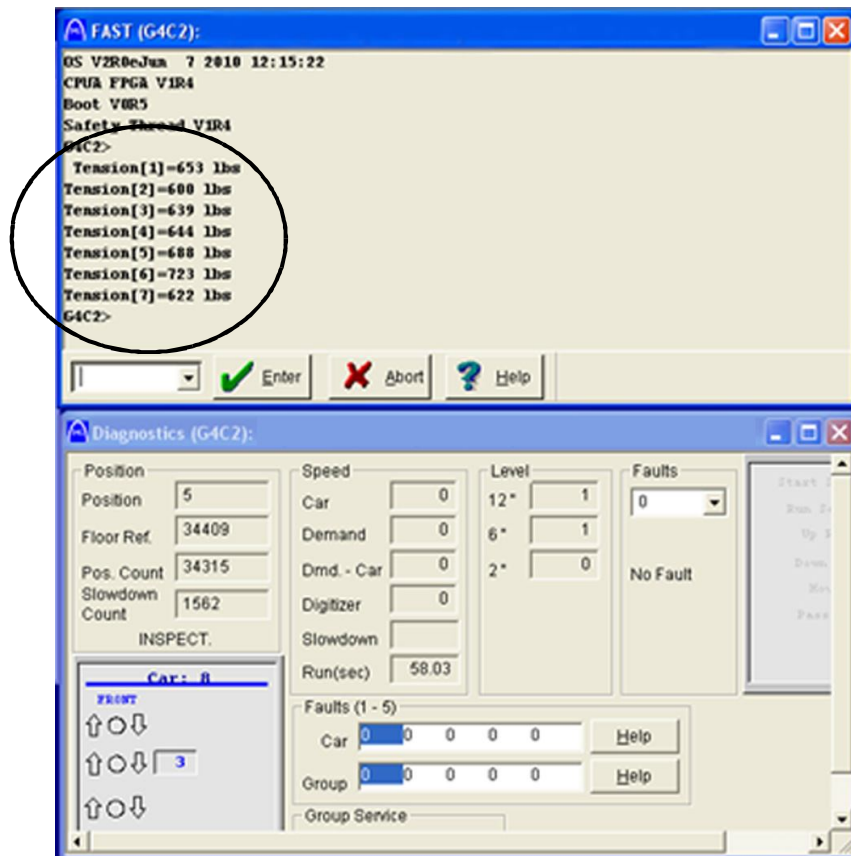


Figure 3 - Tension of the Hoist Ropes

Differential Hoist Rope Tension Test (CANRTM)

(continued)

5. Place the elevator on Car Top Inspection and position the car in order to access the rope sensors at the car dead end hitch assembly.
6. Remove Sensor #1 from the hoist rope.
7. Confirm that the status in the Motion Diagnostic window of IMS changes to "RUN MONTR". See Figure 2.

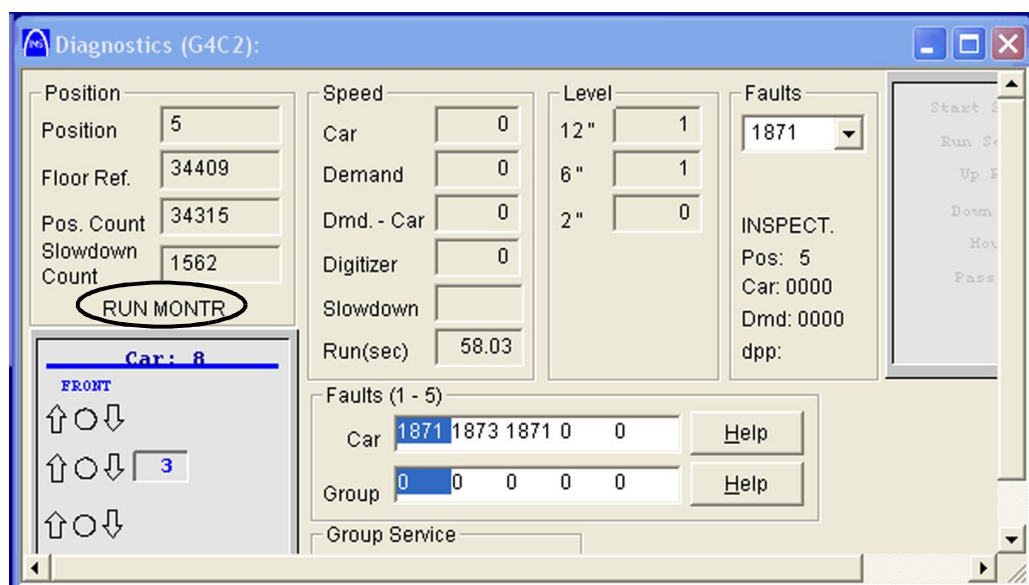


Figure 4 - RUN MONTR

Differential Hoist Rope Tension Test (CANRTM)

(continued)

8. Enter the EMCT command in the Remote Fast of IMS to display the current tension of the hoist ropes. Hoist rope one with the sensor removed should display "0" rope tension. See Figure 5.
9. Enter the FLT command in the Remote Fast of IMS to display the related fault. See Figure 6.
10. Verify that the car will not run on Car Top Inspection.
11. Re-install the sensor on the rope.

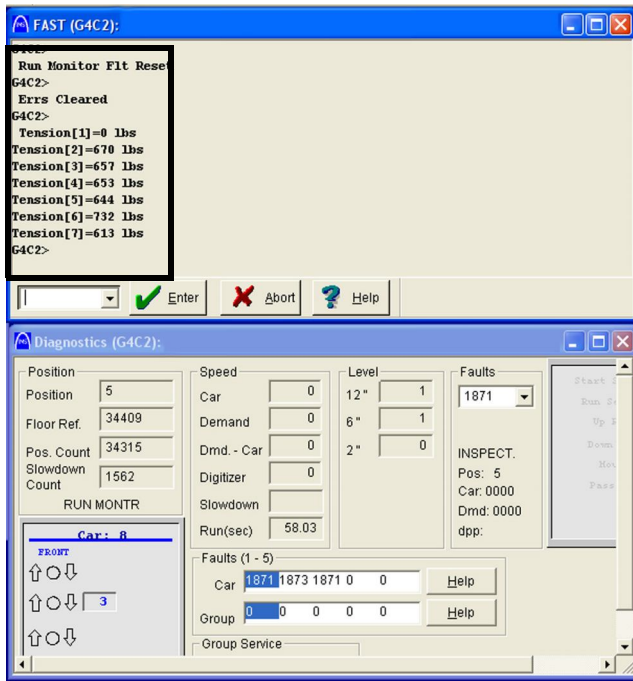


Figure 5 - Hoist Rope One Displays "0"

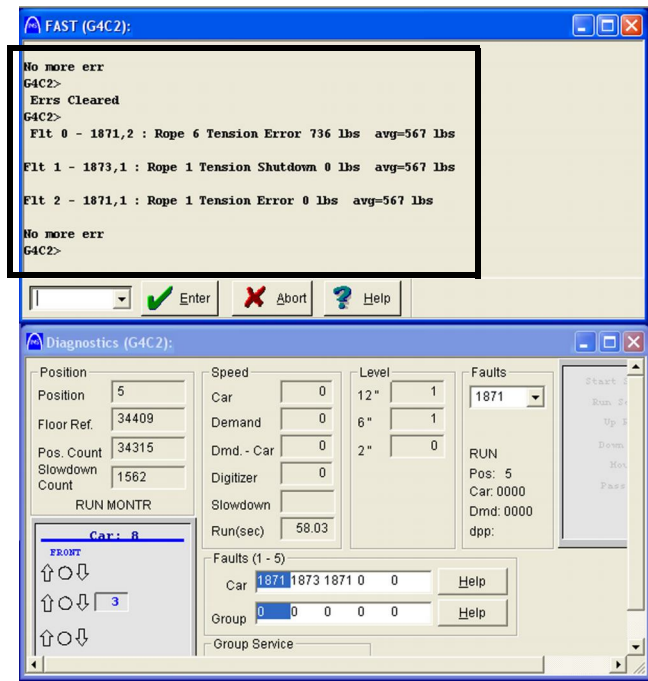


Figure 6 - Related Fault

Differential Hoist Rope Tension Test (CANRTM)

(continued)

12. Enter EMCT command in the Remote Fast of IMS to verify all hoist ropes have tension. See Figure 7.
13. Enter the RRF command in the Remote Fast of IMS to reset the Run Monitor. The status in the Motion Diagnostic window will change to "INSPECT". See Figure 8.
14. Verify that the car will run on car top inspection.
15. Repeat step 5 through step 14 with the remaining sensors and ropes. Verify that when any sensor is removed, the status on the Motion Diagnostic window of IMS changes to "RUN MONTR" and that the car will not run on car top inspection.

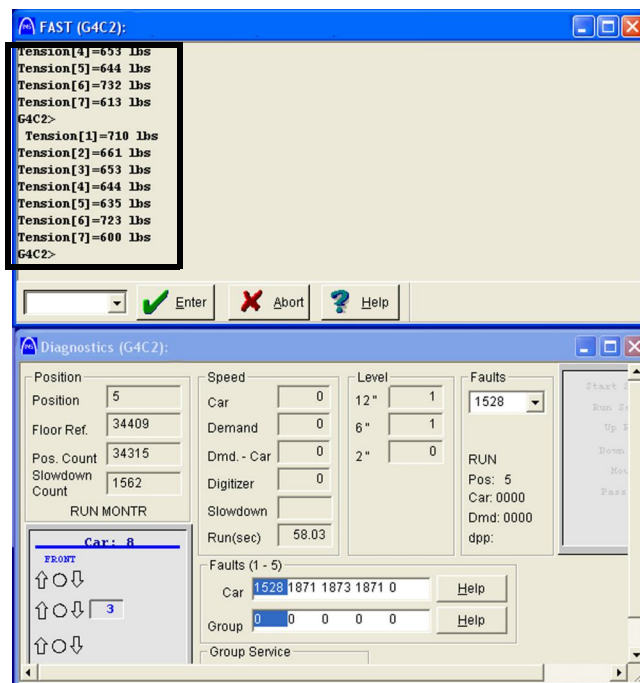


Figure 7 - Verify Rope Tension

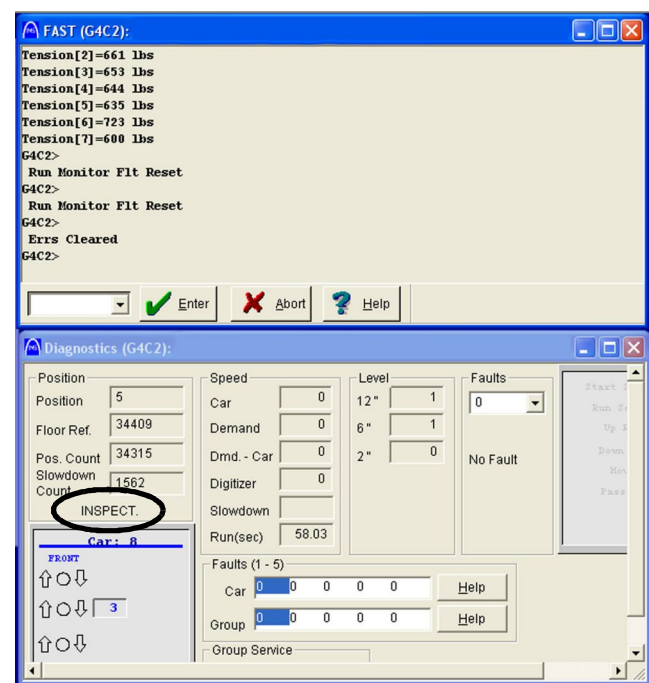


Figure 8 - Inspect Status

Returning to Service

1. With all the sensors re-installed, enter the EMCT command in the Remote Fast of IMS.
2. Verify the rope tensions are similar to the tensions noted in step 4 of the *Differential Hoist Rope Tension Test* procedure. If the hoist rope tensions are not correct, re-calibrate the CANRTM per the *CANRTM* component manual instructions
3. After verification of hoist rope tensions, return the elevator to Door Disconnect service and position the elevator at the bottom landing.
4. Enter the DLW command to verify no load in the elevator cab. If no load shows incorrectly, perform a NLD command at the bottom and top landings to reset the no load.

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