



HYDRAULIC ELEVATOR

BASIC ELEVATOR PROCEDURES MAINTENANCE CONTROL PROGRAM

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Safety Notes

NOTE: Throughout this document, the words and letters “All City Elevator” and “ACE” will mean the same thing.

Safety & Emergency

WARNING THE FOLLOWING PROCEDURES ARE INTENDED FOR THE USE OF QUALIFIED AND AUTHORIZED PERSONNEL ONLY. IN THE INTEREST OF YOUR SAFETY AND THE SAFETY OF OTHERS, DO NOT ATTEMPT ANY PROCEDURES THAT YOU ARE NOT QUALIFIED AND AUTHORIZED TO PERFORM.

Safety Guidelines

Service Technicians should strictly adhere to all safety rules in the All City Elevator Safety Handbook.

Unsafe Elevators

WARNING DO NOT WORK ON ANY ELEVATOR UNLESS IT MEETS THE MINIMUM REQUIREMENTS LISTED BELOW

Elevator Minimum Requirements

- Elevator must have car gate or car doors on each entrance
- Elevator must have all hoistway doors in place & working
- All car & hall interlocks must be in working order
- Elevator must have a car top
- Elevator must have full height enclosure (cab)
- Traction elevators must have safeties per applicable code
- Hoistway must be fully enclosed per applicable code
- Unit must be free of all safety hazards and in good operating condition

Safety Precautions

Note: Tools should be in good working order, replace damaged or defective tools.

Terms in the Manual

Specific warnings and cautions will be found throughout the manual as follows:

Damage to Equipment

WARNING A WARNING STATEMENT IDENTIFIES CONDITIONS THAT COULD RESULT IN PERSONAL INJURY IF IMPROPER PROCEDURES ARE FOLLOWED.

CAUTION A CAUTION STATEMENT IDENTIFIES CONDITIONS THAT COULD RESULT IF PROPER PROCEDURES ARE NOT FOLLOWED.

NOTE: A NOTE IS A STATEMENT USED TO CLARIFY THE INSTRUCTIONS AND/OR ADD ADDITIONAL INFORMATION IN AN EFFORT TO AVOID ANY MISUNDERSTANDINGS IN PERFORMING THE PROCEDURE.

Section 1

General Maintenance Service Guide

Hydraulic– Safety & Emergency

Standard Preventative Maintenance

WARNING CAREFULLY READ THESE INSTRUCTIONS BEFORE BEGINNING MAINTENANCE. THESE INSTRUCTIONS ASSUME KNOWLEDGE OF QUALIFIED & AUTHORIZED METHODS & PRACTICES, WITH PROPER CORRECTION OF PROBLEMS ACCOMPLISHED AT THE END OF THE VISIT. MAINTENANCE REQUIREMENTS FOR SOME JOBS MAY DIFFER FROM THOSE DESCRIBED IN THIS MANUAL. REVIEW THESE PROCEDURES CAREFULLY BEFORE ATTEMPTING ANY WORK TO ENSURE THAT THE TASKS CONTAINED HEREIN ARE APPLICABLE TO THE SPECIFIC JOB.

Introduction

The All City Elevator, Inc. maintenance procedures contained in this manual are organized into two categories: During Visits (performed monthly, quarterly, or semi-annually) and annually, (performed annually).

Task Order

Maintenance tasks are listed in the same order as the Traction Maintenance Tasks and Records, yearly record.

Power ON & OFF

Many maintenance tasks are performed with mainline power **ON** and some tasks are performed with mainline power OFF. Throughout these instructions, tasks that are performed with mainline power **OFF** are shown in bold letters as illustrated below.

WARNING FOLLOW PROPER SAFETY & PRECAUTIONS THROUGHOUT MAINTENANCE PROCEDURES TO ENSURE SAFETY WHEN WORKING WITH MAINLINE POWER **ON & OFF**.

Section 1-1

Hydraulic Maintenance

Periodic Testing & Witnessed Testing Conforms to ASME A17.1
Current Code Adopted by State of Minnesota.

During Each Maintenance Visit, Observe & Adjust/Maintain as Necessary

Hydraulic Tests

Category One (1) Test

NOTE: PROPER COMMUNICATION IS THE KEY TO PERFORMING AN ANNUAL OR 5 YEAR FULL LOAD TEST SAFELY. DO NOT PROCEED ANY STEP OF THE TEST WITHOUT CONFIRMATION AS NEEDED.

NOTE: FOLLOW ALL ACE SAFETY POLICIES WHEN DOING THE TEST

1. Before arriving at the job, discuss the testing plan specific to the particular building conditions.
2. Arrive at the job, check in with the proper building personnel and explain the testing process.
3. Capture the elevator and place "out of service" signs at each landing (as required). Place elevator on car top inspection.

NOTE: PERFORM ALL PRESSURE TESTS WHILE OPERATING THE CAR FROM THE MACHINE ROOM AREA. ABSOLUTELY NO ONE IS TO BE ON THE ELEVATOR. WORK ACTIVITIES ARE TO BE PERFORMED IN COMPLIANCE WITH ACE SAFETY POLICIES.

4. Connect Pressure gauge to high pressure side of hydraulic system in the machine room.
5. Run empty elevator to top floor and record the empty car pressure.
6. Determine full load (working) pressure usually marked on controller door. If not present, a full load must be utilized.
Relief valve bypass pressure = working pressure x 1.25.
7. Turn OFF mainline disconnect using standard Lock-Out/Tag-Out procedure. (See Field Safety Handbook)
8. Place elevator on inspection at the car controller.
9. Place ACE approved jumper/bypass device(s) on top limit switch(es).
10. Connect run box wires to terminals needed to run elevator on inspection operation in both up and down directions.
11. Remove Lock-Out/Tag-Out and turn on mainline disconnect.
12. Position yourself to avoid any positional hazard and within view of pressure gauge.
13. Using the run box, bump car in the up direction until car is on stop ring.
14. Once on stop ring, continue to run in up direction for 30 seconds and document pressure reading at which relief valve operates.

NOTE: IDEAL BYPASS PRESSURE IS 125% OF FULL LOAD PRESSURE BUT MUST NEVER EXCEED 150%.

15. Run car down to a point where its location can be marked and allow it to sit for a minimum of 15 minutes. During this time check for any visible oil leakage at jack head(s) and external piping.
16. If after 15 minutes there is a change in the car position that cannot be accounted for by visible oil leakage, valve leakage, or temperature change, shut the elevator off using standard Lock-Out/Tag-Out procedure.

17. If there is not unexplained change in the car position, repair any detected oil leakage and return the elevator to automatic operation, check for safe operation, and return to service.
18. Fill out the required test form for each unit.
19. Fill out an annual pressure test tag and affix to the elevator controller.
20. If a flex hose is utilized and leaks or deteriorations are observed, replacement of the hose and fittings needs to be facilitated.
21. If a pressure switch is utilized, turn OFF mainline disconnect, lower car onto buffers to relieve all pressure in jack and piping system by using the manual lowering valve. If a final limit is utilized, jump it out at this time.
 - a. Turn the mainline back on. Make sure the car will not operate in the up direction.
 - b. Place ACE approved jumpers/bypass device(s) across pressure switch terminals. Car should operate in up direction when requested on inspection.

Additional Tests (8.11.3.2.3)

22. Verify that all Electrical/Electronic/Programmable Electronic systems (E/E/PES) documentation that is applicable to the job equipment is accessible to the technical personnel performing the tests.
23. Perform all device tests per manufacturers guidelines and verify the devices safety function test was satisfied.
 - a. Normal and Terminal Stopping Devices
 - b. Run the car up to the top floor and place on car top inspection.
 - c. Run car down through the hoistway checking all interlocks, door restrictors, car top stop switch, gate switch, directional limits, and final limits. (if utilized)

NOTE: IF THE FOLLOWING EXISTS ON THE INSTALLATION BEING TESTED, THAT EQUIPMENT MUST BE TESTED AS NOTED BELOW.

24. Emergency Terminal Speed Reducing Devices
 - a. Check directional limits from the machine room on inspection operation. Verify directional limits and final limits are working properly. If the Normal Terminal Slowdown and the Emergency Terminal Slowdown are mechanical switches, verify they are working properly.
 - b. Return car to independent service and test:
 - i. NTS devices – check the bottom and top NTS devices at contract speed.
 - ii. ETS devices – (if applicable) Override the normal terminal slowdown device. Check the bottom and top ETS devices at contract speed.

WARNING WHEN TESTING THE ETS DEVICE ALWAYS TEST THE BOTTOM ETS DEVICE FIRST, FOLLOWING THE MANUFACTURERS GUIDELINES. THE NTS DEVICE IS OVERRIDDEN WHILE THE ETS DEVICE IS BEING TESTED. IF THE ETS SYSTEM FAILS DURING TEST, THE RESULT COULD BE SIGNIFICANT DAMAGE TO THE EQUIPMENT.

25. After the hoistway has been inspected, exit the car top. Return to the machine room to verify that all jumper/bypass devices have been removed.
26. Place the elevator on independent service and run the elevator from top to bottom for several trips to make sure that it is safe to return it to automatic operation.
27. After returning the elevator to normal operation, ride it several times to verify operation.
28. Install data tags as required by code.
29. Power operation of door system
 - a. Refer to “Door Close Force” on this manual and “Door Close Kinetic Energy” for instruction on performing this test.
30. Low Oil Protection Operation
 - a. Place car on independent operation at the second floor. Make sure the doors cannot open. Using the manufacture’s guidelines, inhibit the pump motor from operation when an up automatic demand is placed.
 - b. Place a car call above the car position. The control system should invoke the low oil operation after a predetermined time according the system type.

- c. Once low oil operation is invoked, the control should cancel the up demand and lower the car to the bottom landing and attempt to open and close the doors (one cycle).
 - d. The door open button in the car should reopen the doors as long as the car remains in the landing zone.
31. Firefighters Emergency Operation
- a. Perform fire service operation test procedure, both Phase I and Phase II (if required).
 - b. After fire service operation testing is complete, return the elevator to automatic operation. Ride again to verify normal operation.

Additional Tests (if Applicable)

32. Governors, Overspeed Switch, and Seals
- a. Remove all guards on the car governor and set the jaws.
 - b. Perform the pull-through test.
 - c. After pull-through test is verified, remove all rigging and reset the jaw(s)
 - d. Run the elevator on inspection up and down the hoistway to be sure that the governor is reset properly and the safeties do not set.
 - e. Reinstall all the guards and covers on the governor.
33. Safeties
- a. Go to the pit area, set barricades up at bottom landing. Run the elevator up above the bottom landing to provide clear access to the pit. Secure the elevator using standard Lock-Out/Tag-Out procedures.

WARNING BEFORE ENTERING THE PIT , OPEN THE STOP SWITCH. BEFORE STEPPING INTO THE PIT, VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL. PERFORM RISK ASSESSMENT: IF IT IS NECESSARY TO DEVIATE FROM THE SAFETY ACCESS PROCEDURES, OBTAIN SUPERVISOR APPROVAL BEFORE PROCEEDING.

- b. After entering the pit, check all buffers to ensure they have proper fluid level. If not, replenish. Visually inspect safeties to ensure proper operating conditions.
 - c. Exit pit area using proper pit egress procedures.
 - d. Go back to the controller. Make sure car is on inspection at the controller and the doors are disabled & closed.
 - e. Run the elevator down on inspection at an appropriate location in the hoistway and trip the car governor by hand. Verify that the safeties bring the car to a prompt stop.
 - f. Install ACE approved jumper/bypass device to jump out the safety plank (SOS) switch.
 - g. Before moving the car up to reset the car governor, look in the hoistway to be sure nothing has been damaged.
 - h. Bump the car up to reset the governor.
 - i. Establish communication to verify all persons are in a safe location in the pit. Run the car on inspection.
 - j. Once the elevator is at the bottom floor, turn the mainline disconnect OFF. Reset the safety plank switch, remove the jumper/bypass device. Again, make sure the person in the pit is in a safe location.
 - k. Turn the mainline disconnect back on. Verify that the safety circuit is good.
 - l. Run the car up on inspection. The person in the pit shall safely exit.
34. Oil Buffers
- a. Run the car down on inspection speed and compress the car buffer. Remember, different control types require different means of doing this (jumpers/bypass devices, computers, etc).
 - b. Run the car up on inspection and verify that the car buffer returns to the normal position and reset the buffer switch (if applicable).

NOTE: IF THE BUFFERS DO NOT RETURN TO NORAML POSITION IDENTIFY THE ISSUE AND CALL YOUR SUPERVISOR.

- 35. Notify the proper building personnel that testing is completed, and place the car back in service.
- 36. Update the "Maintenance Log Book"
- 37. Emergency & Standby Power Operation.

NOTE: PERFORMING THIS PROCEDURE IS A COORDINATED EFFORT BETWEEN THE ELEVATOR MAINTENANCE PERSONNEL AND THE BUILDING'S DESIGNATED EMERGENCY POWER TESTING TEAM.

- a. The emergency power testing team will assign a time slot for the elevator test.

- b. Once the elevators are on emergency power operation, performance testing regarding landing accuracy and proper operation will be observed.
- c. Speed test each elevator with a tachometer to verify the elevator is running at contract speed. Paying special attention to the up direction and that no elevator is running above 125% of contract speed.
- d. Notify the emergency power testing team that the emergency testing is completed.

Hydraulic: Category Three (3) Test (8.11.3)

Unexposed Portions of Pistons (Roped Hydro)

1. Capture the car and using the standard Lock-Out/Tag-Out procedures. (See Field Safety Handbook)
2. Using the manufacture's guidelines, provide necessary parts to be tested by a qualified contractor.
3. Upon completion of contract testing, reassemble elevator per manufacturer's guidelines.
4. Ensure elevator is tagged appropriately.
5. Return elevator to automatic service and observe automatic operation.

Pressure Vessels

1. Capture the car and using the standard Lock-Out/Tag-Out procedures. (See Field Safety Handbook)
2. Using the manufacture's guidelines, provide necessary parts to be tested by a qualified contractor.
3. Upon completion of contract testing, reassemble elevator per manufacturer's guidelines.
4. Ensure elevator is tagged appropriately.
5. Return elevator to automatic service and observe automatic operation.

Hydraulic: Category Five (5) Test

NOTE: PROPER COMMUNICATION IS THE KEY TO PERFORMING AN ANNUAL OR 5 YEAR FULL LOAD TEST SAFELY. DO NOT PROCEED ANY STEP OF THE TEST WITHOUR CONFIRMATION AS NEEDED.

NOTE: FOLLOW ALL ACE SAFETY POILICIES WHEN DOING THE TEST

1. Before going to the job, verify the capacities of all elevators to be sure enough test weights are supplied to complete the job. Discuss the testing plan specific to the particular building conditions.
2. Arrive at the job, check in with the building personnel, and explain the testing process.
3. Unload the test weights and stage them in an appropriate location.
4. Capture the elevator and place "out of service" signs at each landing (as required). Place the elevator on car top inspection.
5. Turn OFF the mainline disconnect and disable the car using the standard Lock-Out/Tag-Out procedure.
6. With the car at the top floor use a chain hoist (comealong) and a rope clamp to pull slack from the car governor rope on the tail sheave side. The mechanic should verify that there is enough slack to remove the rope from the car governor sheave.

WARNING VICE GRIPS MAY BE USED TO HOLD THE GOVERNOR ROPE OUT OF THE WAY, BUT SHOULD NOT BE USED TO SUPPORT THE WEIGHT OF THE ROPE AND TAIL SHEAVE. USING VICE GRIPS IN THE APPLICATION CAN RESULT IN PERSONAL INJURY OR DAMAGE TO THE GOVERNOR ROPE.

7. Remove the governor rope from the sheave and tie back as necessary.

8. Have the apprentice come to the machine room to hold the tachometer on the governor sheave while the mechanic spins the car governor.
9. Verify the car governor is properly adjusted for contract tripping speeds, both switch and jaws. If not, re-calibrate and reseal.
10. Put the governor cable back on the sheave. Using standard Lock-Out/Tag-Out procedures, turn machine disconnect power back ON. (See Field Safety Handbook)
11. Have the apprentice go to the car top, running the elevator down on inspection just far enough to tighten the car governor rope. Once completed remove the vice grips.
12. Reinstall all guards and covers on car governor.
13. Run elevator up and down the hoistway on inspection speed to make sure the governor jaws do not drag or set. Also make sure the safeties are not dragging.
14. Go to pit area, set barricades at bottom landing (as required). Run the elevator up above the bottom landing to give clear access to the pit. Secure the elevator using standard Lock-Out/Tag-Out procedures. (See Field Safety Handbook)

WARNING BEFORE ENTERING THE PIT, OPEN THE STOP SWITCH. BEFORE STEPPING INTO THE PIT, VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL. PERFORM RISK ASSESSMENT; IF IT NECESSARY TO DEVIATE FROM THE SAFETY ACCESS PROCEDURES OBTAIN SUPERVISOR APPROVAL BEFORE PROCEEDING. SEE FIELD SAFETY HANDBOOK.

15. After entering the pit, check all buffers to ensure they have the correct fluid levels. If not, replenish. Visually inspect safeties to ensure proper operating condition.
16. Exit pit area using proper pit egress procedures.
17. Go back to the machine room, make sure the car is on independent at the controller and the doors are disabled and closed.
18. Load weights in the elevator cab. Install enough weights in the car (at bottom landing) to meet 100% capacity.

WARNING CAR MAY RELEVEL WHILE LOADING WEIGHTS.

19. Run the elevator to the bottom landing.
20. Set up a top floor car call with the elevator on independent service.
21. Verify the doors are closed.
22. When the elevator reaches contract speed trip the counterweight governor to set the counterweight safeties.
23. Place the elevator on machine room inspection, Install ACE approved jumper/bypass device to jump out the SOS switch.
24. Before moving the car up to reset the car governor, look in the hoistway to be sure nothing was damaged.
25. Bump the car up to reset the governor. Measure the safety slide for code compliance.
26. Enter the pit again following safety protocol.
27. Establish communication to verify all persons are in a safe location in the pit. Run the car down on inspection.
28. Once the elevator is at the bottom floor, turn the mainline disconnect OFF. Reset the safety plank switch, remove the jumper/bypass device. Again, make sure the person in the pit is in a safe area.
29. Turn the mainline disconnect ON. Verify the safety circuit is good.
30. Run the car up on inspection. The individual in the pit shall safely exit.
NOTE: THE NEXT STEP IS A FULL SPEED BUFFER TEST. ONLY THE CAR BUFFERS ARE TESTED WITH A FULL LOAD.
31. Confirm there are no persons in the pit.
32. Run the car down on full speed to hit the buffers. Remember different controller types require a different means of doing the jumper/bypass device, computers, etc.
33. Place the car on inspection from the machine room. Place a jumper on the final limits and run the car up. Remove jumper, verify safety circuit stays up. Look into the pit and make sure the buffers returned to normal position and reset buffer switches (if applicable).

NOTE: IF THE BUFFER(S) DO NOT RETURN TO NORMAL POSITION, IDENTIFY THE ISSUE AND CALL YOUR SUPERVISOR.

34. Run the car to the bottom landing and remove the weights.
35. Run car down to a point where its location can be marked and allow it to sit for a minimum of 15 minutes. During this time check for any visible oil leakage at jack head(s) and external piping.

36. If after 15 minutes there is a change in the car position that cannot be accounted for by visible oil leakage, valve leakage, or temperature change, shut the elevator off using standard Lock-Out/Tag-Out procedure.
37. If there is not unexplained change in the car position, repair any detected oil leakage and return the elevator to automatic operation, check for safe operation, and return to service.
38. Fill out the required test form for each unit.
39. Fill out an annual pressure test tag and affix to the elevator controller.
40. Visually inspect coated rope along its entire length for defects on outer jacket. Using manufacture's guidelines for magnetic fields testing methods to detect broken wires.
41. Using manufacturers guidelines, inspect wire rope fastenings and disassembly of the jack head to check the internal rope connections (if applicable)
42. Plunger gripper (if applicable)
 - a. Put car on independent service at bottom landing.
 - b. Add weight to equal 100% of load.
 - c. Send car to top floor. Using manufacturer's guidelines, perform all test as outlined the manufacturer's instructions.
43. Overspeed Valves
 - a. Put car on independent service at bottom landing.
 - b. Add weights equal to 100% of load.
 - c. Send car to top floor. Using manufacturers guidelines perform all tests as outlined in manufacturers instruction.

Power Unit Oil Level/Condition, Oil Leaks, and Belt Tension

Before taking the car out of service notify the proper building personnel and place "out of service" signs at each landing (as required)

Power Unit Oil Level

1. Check the power unit for proper oil level;
 - a. Send the elevator to the top floor and remove cover from tank unit.
 - b. Submersible unit – Check to see that there is sufficient oil covering the submersible pump.
 - c. Dry unit – Check that the oil sufficiently cover the pump intake.
2. Verify that the oil is not contaminated.

NOTE: IF THE OIL IS CONTAMINATED, CONTACT YOUR SUPERVISOR TO ARRANGE TO REPLACE OR CLEAN THE OIL.

3. Send the car to the bottom landing.
4. Put tank cover on and use gauge to check the oil level.
5. While sending the car to top and bottom floor, listen for unusual noises from the power unit and from the controller. Also check that the car does not re-level during normal operation or while stopped at a floor.

NOTE: IF ANY UNUSUL NOISES ARE DETECTED CHECK THE TROUBLESHOOTING SECTION OF THE PRODUCT MANUAL (WHEN AVAILABLE)

Oil Leaks /Belt Tension

1. Run the car to the top landing using standard Lock-Out/Tag-Out procedures. (see Field Safety Handbook)
2. Visually check for leaks in the power unit and in the machine room piping based on the type of unit.
 - a. On submersible units – leaks can be checked with the cover off unit, visually check valve, hose clamps and pipe connections.
 - b. On dry units – visually check for leaks in the valve, muffler, pump, and in the hose and pipe sections.

3. On dry units, visually check the power unit belt for cracks or glazing, even wear (on both sides) that the belts are not bottomed out in the grooves, and for proper tension (belt slippage).
4. If emptying pan of fluid, use proper oil disposal procedures.

NOTE: THE FOLLOWING GUIDELINES APPLY WHEN TESTING, ADJUSTING, OR REPLACING BELTS.

- Use lockout tagout.
- Ideal tension is the lowest tension at which the belt will not slip at peak load.
- All belts in the set should be tested for equal tension by pushing each belt down at the midpoint between pulleys (typical deflection is 3/8" with 10 lbf applied)
- If belts require tensioning, check the sheave alignment with a straight edge.
- IF belts are replaced on multi-groove sheaves, change them as a matched set.

Motor Starter Contacts/Connections

Before taking the car out of service notify the proper building personnel and place "out of service" signs at each landing (as required)

1. Disable the car using the standard Lock-Out/Tag-Out procedure. (See Field Safety Handbook)
2. With power OFF remove the starter cover(s).
3. Visually inspect, if possible, the contacts for excessive wear (replace if necessary) adequate follow up and for signs of overloading or overheating. Clean out dust and filing and replace the cover(s).
4. Check that all mechanical connections on the overload, starters, bridging bars, and interlocking device (Y-MS only) are tight.
5. Check the auxiliary contacts of the starters and contacts of starters and contactors for proper operation, setting, and wire termination.

Clean & Inspect Machine Room

Before taking the car out of service, notify the proper building personnel, and place "out of service" signs at each landing, (as required).

WARNING ELECTRIC SHOCK 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 TO GROUND MAY BE PRESENT AT MANY POINTS.

Machine Room Inspection

Enter & inspect the machine room for conditions that may have changed since the last inspection, (improper lighting, storage of equipment, proper temperature, etc).

NOTE: REPORT ANY CODE VIOLATIONS OBSERVED TO YOUR SUPERVISOR.

Motor Lubrication

DO NOT OVER/UNDER LUBRICATE! Lubricate the motors as required based on the type of bearings. (See the nameplate, motor application details.)

Cleaning Machine Room.

Check machine room for cleanliness:

- Hoist motor and machine
- Controller (outside only)
- Floor

NOTE: IF CLEANING IS REQUIRED, REMOVE SOILED RAGS FROM PREMISES AND PUT RAGS IN AN APPROVED METAL CONTAINER; DO NOT USE THE OWNER'S DUPSTER (Follow EPA rules for disposing of hazardous waste materials, or consult your supervisor)

Controller Components

Visually inspect controller for signs of wear or excessive heat, & for secure mounting.

Steps to Check Controller Components

1. Turn OFF mainline disconnect using the standard Lock-out/Tag-out procedures. (See Field Safety Handbook)
2. Clean the inside of controller (including components).
3. Visually inspect all wire terminations for stray wire strands, proper spacing between the other conductors, and loose connections.

NOTE: VISUALLY INSPECT FOR CLIP JUMPERS THAT MAY BE PRESENT AND IF ANY ARE FOUND, INVESTIGATE TO DETERMINE WHY THEY ARE PRESENT. IF FOUND, THE CONDITION MUST BE CORRECTED & REPORTED TO YOUR SUPERVISOR.

4. Visually check resistors, transformers and rectifiers for signs of excessive heat and dust.
5. On components P&B, check the contacts on relays 14 & 15 for excessive wear. Verify that the stems are tight. Check that all wire and shunt connections are tight.
6. Check all power relays for proper contact wipe.
7. Check for proper fuse sizes.
8. Check air filters in the controller and card rack (if available). Clean or change as required.
9. Check the SCR heat sinks for excessive dust (blow out if required)

Steps to Check Motor Starters/Contactors.

1. Turn OFF mainline disconnect using the standard Lock-out/Tag-out procedures. (See Field Safety Handbook)
 - a. Inspect the contacts for excessive wear, adequate wipe, and signs of overloading or overheating.
 - b. Clean out dust & filing & replace cover.
2. Check that all mechanical connections on the overload, starter, bridging bars, and interlocking device (Y-MS only) are tight.
3. On SCR drives, inspect the M contacts for excessive wear & adequate follow-up, & signs of overheating.
4. Check the auxiliary contacts of starters and contactors for proper operation, setting, and wire terminations.

Steps to Check Controller

1. Turn OFF mainline disconnect using the standard Lock-out/Tag-out procedures. (See Field Safety Handbook)
2. Check that all terminal connections & components are tight.
3. Turn ON mainline disconnect using the standard Lock-out/Tag-out procedures. (See Field Safety Handbook)
4. Check DC loop overloads (or drive overload) as required by local code.

NOTE: REPORT ANY CODE VIOLATIONS OBSERVED TO YOUR SUPERVISORS.

5. Test the reverse phase relay, if applicable.

Car Top Guide Shoes/Roller Guides

Before taking the car out of service notify the proper building personnel and place “out of service” signs at each landing (as required).

WARNING PRIOR TO ENTERING THE HOISTWAY ALL ACE SAFETY POLICIES MUST BE PERFORMED. BEFORE STEPPING ONTO THE CARTOP, VISUALLY INSPECT FOR EXCESSIVE GREASE OR OIL.

Shoes

1. Inspect the top guide shoes for proper clearances, adjustments, wear & lubrication.
2. Lubricate guide rails if required.

NOTE: APPLY LUBRICATION AS NECESSARY PER MANUFACTURERS RECOMMENDATIONS

Rollers

Inspect the car top rollers for proper clearances, adjustments and wear. Check rollers for signs of wear or deterioration. Rollers should be centered and plumb on the face of the rail. They should track evenly across the face of the rail as the car moves. Each roller should be tensioned to the face of the rail enough to hold the car centered in the guides. Grasp each roller individually and turn the roller in the up and down directions. Each roller should slip on the rail face with moderate twisting force. All rollers should have the same amount of tensioning force on them regardless of the manufacture, but all of the rollers should be of the same material and size. Excessive roller pressure against the face of the rail will result in premature roller wear, damaging the friction surface of the roller, the roller bearings or both. Refer to OEM product manual for instruction on maintenance, alignment methods and adjusting procedures.

Leveling Device Hardware

WARNING PRIOR TO ENTERING HOISTWAY, BEFORE STEPPING ONTO THE CAR TOP, VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL.

1. Clean and inspect tape guides for wear.
2. Inspect magnets (check for metal shavings)
3. Check for debris.
4. Check alignment on vanes, tapes, magnets, and reading devices.
5. Check that all are properly engaged.
6. Clean and lubricate selector tape. Also check spring tension.

TOP OF CAR OPERATING {INSPECTION} DEVICE, INCLUDING STOP SWITCH, & LIGHT

Before taking the car out of service notify the proper building personnel and place “out of service” signs at each landing (as required).

WARNING PRIOR TO ENTERING THE HOISTWAY ALL ACE SAFETY POLICIES MUST BE PERFORMED. BEFORE STEPPING ONTO THE CARTOP, VISUALLY INSPECT FOR EXCESSIVE GREASE OR OIL.

Access to top for the car through the preferred OEM method, as noted in the OEM product manual.

1. Turn the car top light on before stepping onto the top of the car. Place the car on car top inspection by activating the inspection switch. Then place the RUN/STOP switch mounted on the top of the car inspection device in the stop position.
2. Once situated in a safe place on the car top close the car door(s) if needed, and then the hoistway door(s) used to gain access to the car top. There should be absolutely no movement of the car at this time.
3. Locate the utility power receptacle. It should be of the GFCI type. Press the test button on the GFCI receptacle, noting the OEM test status indicator. If the test fails, replace the GFCI receptacle with a new working unit. If the test is successful, press the reset button on the unit.
4. Press the safety interlock and down inspection buttons located on the top of the car inspection station simultaneously there should be no movement of the car. Release the safety interlock and Down inspection buttons
5. Press the safety interlock and Up inspection buttons located in the top of the car inspection station simultaneously. There should be no movement of the car. Release the safety interlock and Up inspection buttons.
6. Momentarily press the Up, Safety Interlock, & Down buttons individually for a few seconds each, noting no car movement.
7. Reopen the car door so that the OEM gate switch is not actuated. Return the top of the car Stop Switch to its RUN position and retest the inspection direction switches as noted in steps 4-6. If the car did not move, place the RUN/STOP switch into the stop position and close the car door(s).
8. Reopen the hoistway door(s) just enough to deactivate the hoistway door interlock. Return the top of car Stop Switch to its RUN position and retest the inspection direction switches as noted in steps 4-6. If the car did not move, reactivate the top of the car Stop Switch and close the hoistway door(s).
9. Press the safety interlock and down inspection buttons located in the top of car inspection station simultaneously. The car should move down at inspection speed. Release the safety interlock and down inspection buttons to stop the car.
10. Press the safety interlock and up inspection buttons located in the top of car inspection station simultaneously. The car should move up at inspection speed. Release the safety interlock and up inspection buttons to stop the car.

All other top of car maintenance functions can be performed at this time.

NOTE: WHENEVER THE CAR IS STOPPED FOR AN EXTENDED PERIOD OF TIME AND ANY MAINTENANCE OR REPAIR FUNCTION IS PERFORMED THAT REQUIRES ANY PART OF THE BODY TO BE EXTENDED PAST THE BOUNDARIES OF THE CAR, IT IS A GOOD IDEA TO ACTIVATE THE STOP SWITCH TO HELP GUARD AGAINST INJURY DUE TO UNINTENDED MOVEMENT OF THE CAR.

Emergency Light

Some jobs may have an emergency light unit on top of the car and require this test to be performed from the top of the car.

WARNING PRIOR TO ENTERING THE HOISTWAY ALL ACE SAFETY POLICIES MUST BE PERFORMED. BEFORE STEPPING ONTO THE CARTOP, VISUALLY INSPECT FOR EXCESSIVE GREASE OR OIL.

1. Access to Emergency Light unit
2. Test the Emergency Light (as required) based on the type of unit.
 - a. While holding the test button, momentarily press the alarm button and verify the alarm bell rings.
 - b. Release the test button and verify that the Emergency Light goes out.
 - c. Press the alarm button again and verify it still rings.
 - d. With normal 110-120 VAC power on the car, press the "test button" on the Power-Pack and verify the Emergency Light turns on. If there is not a Test button, remove 110-120 VAC from the circuit at the motor room disconnect and check.

NOTE: IF THERE IS NO TEST BUTTON REMOVE 110-120 VAC POWER FROM CAR AND VERIFY THAT THE EMERGENCY LIGHT AND THE ALARM BELL BOTH WORK.

Clean & Inspect Car Top Devices

Before taking the car out of service notify the proper building personnel and place “out of service” signs at each landing (as required).

WARNING PRIOR TO ENTERING THE HOISTWAY ALL ACE SAFETY POLICIES MUST BE PERFORMED. BEFORE STEPPING ONTO THE CARTOP, VISUALLY INSPECT FOR EXCESSIVE GREASE OR OIL.

NOTE: PERFORM RISK ASSESSMENT IF IT IS NECESSARY TO DEVIATE FROM ACE STANDARD SAFETY PROCEDURES FOR ACCESSING ANY CAR TOP OR PIT. OBTAIN SUPERVISOR APPROVAL BEFORE PROCEEDING.

Follow the instructions in this section for placing the elevator on car top inspection in tasking instructions for “Top of Car Operating (Inspection) Device Including Stop Switch and Light”

1. Use of a vacuum is desirable, but if it is not present, a small 4” paint brush can be used to “sweep” the car top and surrounding structures. Be careful to keep airborne dust to a minimum, as it tends to adhere to or interfere with critical optical and moving components in the hoistway. Do not use “Tornado” blowers or vacuum cleaners in reverse, as the discharge from these devices placing high static charge on the surfaces they contact.
2. Run the car on inspection to the lowest landing and remove any dirt.

Car Door, Gate Equipment, & Operator

Before taking the car out of service, notify the proper building personnel and place “out of service “ signs at each landing (as required).

WARNING ELECTRIC SHOCK CAN CAUSE PERSONAL INJURY OR LOSS OF LIFE. CIRCUIT BREAKERS, SWITCHES, & 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 TO GROUND MAY BE PRESENT AT MANY POINTS. SEE THE FIELD SAFETY HANDBOOK.

WARNING PRIOR TO ENTERING THE HOISTWAY ALL ACE SAFETY PROCEDURES MUST BE FOLLOWED. BEFORE STEPPING ON TO THE CARTOP VISUALLY INSPECT FOR EXCESSIVE GREASE OR OIL.

Perform a visual check of the door operator power transfer belts, wire ropes, lead screws, and/or linkage. Replace any worn or defective parts according to the OEM guidelines as stated in the OEM product manual.

Visually check the door rollers & hanger assemblies for any wear or damage. Use a small 4” paint brush to remove any dust or airborne contaminants that have adhered to any of the door equipment surfaces. Be careful not to misalign any switches or actuating cams associated with the door operator or the surrounding equipment. The door track surface should be lightly polished with “scotch bright” or other similar cleaning material paying special attention to the debris build up that forms at the point on the door track where hanger rollers stop when the doors are in the fully closed and fully open position.

Visually inspect the clutch and linkage associated with the car door locking device if appropriate. Use the OEM instruction in the equipment product manual to test, adjust, renew, and work of damaged parts for the above mentioned equipment.

Inspect the door reopening device(s) travel cabling for any wear, tears, or cracking of the outer insulation, paying close attention to the stationary tie points. This is where most failures of the traveling cable(s) will occur. Inspect, adjust and test any linkages and switches if the door reopening device is the mechanical type. Reference the OEM product manual for tolerances and instructions. If photo electric “eyes” are incorporated into the door reopening scheme ensure that the lenses of the transmitter(s) and receivers(s) are clean and aligned according to the OEM product manual instructions.

The door gib sill groove (if applicable) should be clean and free of any debris. The fasteners that hold the car door sill rigid to the platform should all be secure. Visually inspect each gib for noticeable wear, and renew per OEM instructions. Check the tongues or tabs for proper placement.

Ensure that the doors open & close with a minimum amount of noise, and that the doors are free in the gib slots throughout the range of movement.

Ensure that all the gib fasteners are secure per the OEM instructions.

Ensure that all of the following are operating correctly: Car Stop Switches(s), Emergency Communications, Signals/Buttons, Alarm (Optional Switches/Buttons), Emergency Light & Ventilation.

Before taking the car out of service notify the proper building personnel and place “out of service” tags at each landing (as required).

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Traveling Cable(s)

Before taking the car out of service notify the proper building personnel and place “out of service” signs at each landing (as required).

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WARNING BEFORE ENTERING THE PIT, OPEN THE STOP SWITCH. BEFORE STEPPING INTO THE PIT, VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL. PERFORM RISK ASSESSMENT; IF IT NECESSARY TO DEVIATE FROM THE SAFETY ACCESS PROCEDURES OBTAIN SUPERVISOR APPROVAL BEFORE PROCEEDING. SEE FIELD SAFETY HANDBOOK.

1. Go to the pit area. Set barricades up at bottom landing. Run the elevator up above the bottom landing to give clear access to the pit. Secure the elevator using standard Lock-Out/Tag-Out procedures.
2. From the pit, confirm the traveling cable(s) has not contact with foreign objects or is improperly tracking, take corrective action if required. Inspect the entire length of traveling cable jacket for cracks, cuts, tears, abnormal wear or severe twists. Inspect hanging devices used to alleviate undue strain on the traveler.

WARNING PRIOR TO ENTERING THE HOISTWAY ALL SAFETY POLICIES MUST BE FOLLOWED! BEFORE STEPPING ONTO THE CAR TOP VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL.

3. Next move to car top while running on inspection. Confirm the traveling cable has no contact with foreign objects or is improperly tracking, take corrective action if required. Inspect entire length of traveling cable jackets for cracks, cuts, tears, abnormal wear or severe twists. Inspect hanging device used to alleviate undue strain on the traveler. Inspect the traveler where the cable enters/leaves the hoistway.

Hoistway Doors, Tracks, and Door Locks

Before taking the car out of service notify the proper building personnel and place “out of service” signs at each landing (as required).

WARNING PRIOR TO ENTERING THE HOISTWAY ALL ACE SAFETY POLICIES MUST BE PERFORMED. BEFORE STEPPING ONTO THE CARTOP, VISUALLY INSPECT FOR EXCESSIVE GREASE OR OIL.

NOTE: TO BE PERFORMED ON ALL DOORS. REFER TO SPECIFIC HOISTWAY DOOR PRODUCT MANUAL FOR SPECIFICATIONS AND REPLACEMENT PARTS.

1. Secure access to the top of the elevator observing all ACE safety procedures.
2. Position elevator to a safe and comfortable working height using the car top controls.
3. Manually open the doors and observe the operation of the closer through the full range of the opening, listen for any dragging or rubbing. Inspect door tracks; clean and/or remove any build up on tracks and lubricate as needed.
4. Check all fastenings for tightness; lubricate pivot points as required.
5. Check gibs for tightness and wear; replace if required. Check fire tabs on gibs.
6. Observe proper clearances $\frac{1}{4}$ "- $\frac{3}{8}$ " around and under door panel. Check the up thrust roller for proper clearances (0.008 inch)
7. Manually release the pick-up rollers and check interlock for proper clearances and adjustment. Inspect and clean contacts if required.
8. Confirm that the car will not move with the doors open when trying to run on inspection.
9. Examine the sign guards, astragals and dust cover for wear and tightness.

NOTE: REPORT ANY DEVIATIONS TO YOUR SUPERVISOR.

10. Inspect entire sill and clean as necessary.

Directional/Final Limits

Before taking the car out of service notify proper building personnel and place “out of service” signs at all landings (as required).

WARNING PRIOR TO ENTERING THE HOISTWAY ALL SAFETY POLICIES MUST BE FOLLOWED! BEFORE STEPPING ONTO THE CAR TOP VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL.

1. Visually inspect the limit actuating device(s) as well as the alignment of the limit device(s) themselves to ensure proper engagement. The actuating device should be sufficient in length and the limit devices adjusted so that they will stay active from the point of contact through the physical limits of car motion (buffer fully compressed).

NOTE: SOME NORMAL DIRECTIONAL LIMIT SWITCHES ARE LOCATED ON THE SELECTOR SYSTEM.

2. With the car on inspection, move the car down or up until the normal direction limit is engaged and the car comes to a complete stop. Then demand direction should be reversed and the car allowed to travel a short distance to ensure that the final limit device has not been operated at the same time as the normal limit.

NOTE: ON ELEVATORS WITH SPRING BUFFERS, NORMAL/DIRECTIONAL LIMIT WILL STOP THE CAR BEFORE CONTACT WITH THE BUFFERS.

3. Actuate the final limit manually to verify that the safety circuit has opened and the car will not move in either direction.
4. Repeat at opposite terminal.

Clean & Inspect Hoistway

Before taking the car out of service notify proper building personnel and place “out of service” signs at all landings (as required).

NOTE: BEFORE MOVING THE CAR FAMILIARIZE YOURSELF WITH THE POSITION OF THE OTHER CARS IN THE VICINITY OF THE CAR BEING ACCESSED.

1. Run the car on inspection to a location below the highest landing to access the car top. Set up barricades as required.

WARNING PRIOR TO ENTERING THE HOISTWAY ALL ACE SAFETY POLICIES MUST BE FOLLOWED! BEFORE STEPPING ONTO THE CAR TOP VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL.

2. From the car top move the car on inspection.
3. Clean dirt and trash from all horizontal surfaces.
4. Clean hoistway rails and brackets, door tracks and sills.
5. Use a dustpan and brush for large objects and a shop vacuum for the finish cleaning. Do not clean by blowing debris.
6. When cleaning and inspection of hoistway is complete, remove cleaning equipment, tools, and any debris from the car top. Restore car to normal operation. Run car on automatic up and down to check for proper operation.

Car Bottom Guide Shoes/Roller Guides

Before taking the car out of service notify the proper building personnel and place “out of service” signs at each landing (as required)

1. Run the car up high enough to safely access the pit, stop switch, pit light, and bottom guides. Secure the car using standard Lock-Out/Tag-Out procedures. (see Field Safety Handbook)

NOTE: BEFORE ENTERING THE PIT, CHECK WITH THE APPROPRIATE BUILDING PERSONNEL AND DETERMINE IF THE PIT AREA IS CLASSIFIED BY THE PROPERTY OWNER/MANAGEMENT AS PERMIT REQUIRED SPACE. REFER TO THE FIELD SAFETY HANDBOOK FOR PROPER PROCEDURE.

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WARNING BEFORE ENTERING THE PIT , OPEN THE STOP SWITCH. BEFORE STEPPING INTO THE PIT, VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL. PERFORM RISK ASSESSMENT: IF IT IS NECESSARY TO DEVIATE FROM THE ACE SAFETY ACCESS PROCEDURES, OBTAIN SUPERVISOR APPROVAL BEFORE PROCEEDING.

2. Turn the pit light on and open the stop switch.

Shoes

1. Inspect the bottom guides shoes for proper clearances, adjustments, wear and lubrication.
2. Lubricate guide rails if required.

NOTE: APPLY LUBRICATION AS NECESSARY PER THE MANUFACTURERS RECOMMENDATIONS.

Rollers

1. Inspect the car bottom rollers for proper clearances, adjustments, and wear.
2. Check rollers for signs of wear or deterioration. Rollers should be centered and plumb on the face of the rail. They should track evenly across the face of the rail as the car moves. Each roller should be tensioned to the face of the rail enough to hold the car centered in the guides.

3. Grasp each roller individually, and turn the roller in the up and down directions. Each roller should slip on the rail face with moderate twisting force. All rollers should have the same amount of tensioning force on them regardless of the manufacture, but all rollers should be of the same material and size. Excessive roller pressure against the face of the rail will result in premature roller wear, damaging the friction surface of the roller, roller bearings or both.
4. Refer to the OEM product manual for instruction on maintenance, alignment methods, and adjusting procedures.

Clean & Inspect Pit Condition, Pit Lighting, & Stop Switch

Before taking the car out of service notify the proper building personnel and place “out of service” signs at each landing (as required)

Pit Inspection

1. Go to pit area. Set the barricades up at the bottom landing. Run the elevator up above the bottom landing to give clear access to the pit. Secure the elevator using proper Lock-Out/Tag-Out procedures.

NOTE: BEFORE ENTERING THE PIT. CHECK WITH THE APPROPRIATE BUILDING PERSONNEL AND DETERMINE IF THE PIT AREA IS CLASSIFIED BY THE PROPERTY OWNER/MANAGER AS A PERMIT REQUIRED CONFINED SPACE.

WARNING BEFORE ENTERING THE PIT , OPEN THE STOP SWITCH. BEFORE STEPPING INTO THE PIT, VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL. PERFORM RISK ASSESSMENT: IF IT IS NECESSARY TO DEVIATE FROM THE ACE SAFETY ACCESS PROCEDURES, OBTAIN SUPERVISOR APPROVAL BEFORE PROCEEDING.

2. Turn the pit light on and open the stop switch
3. Enter and inspect the pit for conditions that may have changed since the last inspection (improper lighting, ladders, etc., or any water in the pit).

NOTE: REPORT AND CODE VIOLATIONS FOUND TO YOUR SUPERVIOR

Clean Pit

1. Visually inspect and/or clean the pit as needed according to the contract to keep the pit free of debris. Be mindful of smoke detectors in the pit area.
2. Once pit work is complete, remove cleaning supplies and debris, exit the pit and restore power to the system using the standard Lock-Out/Tag-Out procedure.

NOTE: INFORM BUILDLING MANAGER OF ANY STANDING WATER!

Spring Buffers

Visually inspect the spring buffers for secure mounding, corrosion, or other defects, and proper tags.

Oil Buffers

Visually inspect the oil buffers for any leaks, proper switch adjustments, or physical defects such as secure mounting, corrosion or other defects and for proper tags.

Pit Equipment

1. Lube pit equipment as required.

Jack/Packing & Oil Recovery Device

Before taking the car out of service notify the proper building personnel and place “out of service” signs at each landing (as required)

1. Use standard ACE pit access and secure using the standard Lock/Out-Tag/Out procedures. (see Field Safety Handbook)

NOTE: BEFORE ENTERING THE PIT, CHECK WITH THE APPROPRIATE BUILDING PERSONNEL AND DETERMINE IF THE PIT AREA IS CLASSIFIED BY THE PROPERTY OWNER/MANAGEMENT AS PERMIT REQUIRED SPACE. REFER TO THE FIELD SAFETY HANDBOOK FOR PROPER PROCEDURE.

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WARNING BEFORE ENTERING THE PIT , OPEN THE STOP SWITCH. BEFORE STEPPING INTO THE PIT, VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL. PERFORM RISK ASSESSMENT: IF IT IS NECESSARY TO DEVIATE FROM THE ACE SAFETY ACCESS PROCEDURES, OBTAIN SUPERVISOR APPROVAL BEFORE PROCEEDING.

2. Turn the pit light on and open the stop switch.

Jack Packing

1. Visually inspect the cylinder head for leakage from the seal or gasket. Inspect for blockage of discharge line to discharge bucket; empty as necessary (follow EPA rules for the disposal of use oil and/or hazardous waste, or consult your supervisor.)Record the emptying of discharge from the bucket in the Maintenance Log.

NOTE: ANY UNEXPLAINED OIL LOSS SHOULD BE REPORTED TO YOUR SUPERVISOR IMMEDIATELY.

2. Check for excessive oil on the outside of the jack’s cylinder.
3. Check for excessive oil on the piston.
4. If severe leakage is detected, contact your supervisor.

Oil Recovery Device

1. Check Oil Recovery Device to make sure that it is operating properly and that the container is not leaking.
2. Inspect for blockage of discharge line to Oil Recovery Device.
3. Once the pit work is complete, exit the pit and restore power to system using standard Lock-Out/Tag-Out procedure. (See Field Safety Handbook) Once power is restored, close pit switch and turn pit light off. Return unit to normal operation.

NOTE: WHEN USING A PIT BOTTLE OR BUCKET TO COLLECT OIL, WHENEVER POSSIBLE, USE A CLEAR BOTTLE OR BUCKET SO ENTRANCE TO THE PIT IS NOT ALWAYS NECESSARY TO CHECK THE AMOUNT OF OIL COLLECTED.

Oil Lines, Supports & Spring Buffers

Before taking the car out of service notify the proper building personnel and place “out of service” signs at each landing (as required)

1. Got to pit area, set barricade at bottom landing. Run the elevator above the bottom landing to give clear access to the pit. Secure the elevator using standard Lock-Out/Tag-Out procedures. (see Field Safety Handbook)

NOTE: BEFORE ENTERING THE PIT, CHECK WITH THE APPROPRIATE BUILDING PERSONNEL AND DETERMINE IF THE PIT AREA IS CLASSIFIED BY THE PROPERTY OWNER/MANAGEMENT AS PERMIT REQUIRED SPACE. REFER TO THE FIELD SAFETY HANDBOOK FOR PROPER PROCEDURE.

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Oil Lines & Supports

1. Check for leaks or loose fittings; make sure the supports are adequate.
2. Check tag on high pressure flex hose for proper dates.

Spring Buffers

1. Visually inspect the spring buffers for secure mounting, corrosion, other defects, and proper tags.

Stopping Accuracy

Floor Level

1. Enter the elevator & check all floor levels for a rough estimate of the car's position to the hoistway floor.
2. Perform high-speed run when possible. Move from top floor to one floor down (worst possible leveling condition).

NOTE: A PRECISE FLOOR LEVELS OF 1/2:" OR LESS IS REQUIRED.

WARNING IF LEVELING VARIANCE IS GREATER THAT ½", THE ELEVATOR SHOULD BE SHUT DOWN UNTIL THE PROBLEM CAN BE RESOLVED.

Door Close Force

Door Torque

1. With elevator on automatic operation.
2. Open doors.
3. When doors start to close, stop doors midpoint by holding door without interrupting reopening devices.
4. Place door torque gauge on leading edge of door.
5. Release door, so door engages door torque gauge.
6. With door torque gauge holding doors, check door torque measurements.
NOTE: BY CODE, THE FORCE MUST NOT EXCEED 30 LB (POUNDS-FORCE): SEE RULES 112.1 OF ASME 17.1E-1987 CODE.

Car Door Reopening Devices

Before taking the car out of service, notify the proper building personnel, and place "out of service" signs as each landing, (as required).

1. Allow the elevator door to start to close and check that the safety edge, when retracted, will reopen the doors from mid-travel and at 3" from fully open. Perform this same test using the door open button.
2. Verify that the safety edge or infrared curtain unit can be activated with the doors FULLY OPEN.

NOTE: IF THE ELEVATOR IS EQUIPPED WITH ANOTHER REOPENING DEVICE, ACTIVATE IT TO ENSURE THAT THE DOOR REOPENS.

NOTE: IF THE JOB IS EQUIPPED WITH THE LIMITED DOOR REVERSAL OPTION, DOORS SHOULD REOPEN TO A POINT ABOUT TWO THIRDS OPEN, THEN CLOSE.

3. If photo eyes are installed on the unit, allow the doors to start to close and then break the light beam with your hand at 5" and 29" above the car sill to check that the doors reopen.

NOTE: TO GET THE ACCURATE TEST OF THE BEAM, BE CAREFUL NOT TO TOUCH THE LIGHT CURTAIN WITH YOUR HANDS.

4. Clean photo eyes or wipe down light curtains.
5. Visually check the door operator arms, car door rollers, relating wire ropes, clutch, restrictor, & safety edge/photo eyes are securely fastened and function properly.
6. Lubricate pivot points if required.
7. Check belts for wear, cracking, and stretch. Make repairs and adjust as necessary.
8. Notify the proper building personnel that work is completed. Put the car back in service.

NOTE: REPORT ALL OBSOLETE AND BADLY WORN SAFETY EDGES TO A SUPERVISOR FOR POTENTIAL REPLACEMENT.

WARNING IF THE PHOTO EYE OR DETECTOR HAS BEEN TURNED OFF, SHUT DOWN THE ELEVATOR FOR SAFETY REASONS UNTIL THE ISSUE WITH THE PHOTO EYE OR DETECTOR CAN BE RESOLVED. "SHUT OFF" SWITCHES SHOULD BE ELIMINATED (ADVISE SUPERVISOR).

Car Stop Switch(es), Emergency Comm., Signals/Buttons, Alarm (Optional Switches/Buttons, Emergency Light & Ventilation

While the car is stopped at one of the floors, if the car stop switch is a manual push button type, operate it briefly. Ensure that when the switch is activated, the alarm bell rings, and the doors do not close. If the stop switch is the keyed type, actuate it with the proper key inserted and make sure the doors do not close.

Emergency Communications

Inspect the operation of the phone and intercom (hall to car) or any other Emergency Communication devices & notify your supervisor, (prior to leaving the job) if it is not working properly. Be sure to check phone with disconnects shut off.

NOTE: IF THE JOB HAS NO EMERGENCY COMMUNICATIONS, REPORT THE CONDITION TO YOUR SUPERVISOR.

Signals, Buttons

1. Push all car calls in the operating panel to check car calls and lamps.
2. Check the position indicators as the car travels the hoistway.
3. Observe the operation of the floor passing tones (if the car is equipped with handicapped features).
4. As the car stops at each floor, push all hall call buttons to check hall calls and lamps.
5. Check the hall lanterns and gongs at each floor and the car riding lantern gongs (if provided).

Alarm

1. Test Emergency Alarm and any other signals for proper function.

Emergency Light

1. Access the emergency light unit.
2. Test the Emergency light (as required) based on the type of unit
 - a. With normal 110-120 VAC power on the car, press the "test button" on the power-pack. Verify that the Emergency Light turns on
 - b. While holding the test button momentarily press the alarm button and verify the alarm bell rings.
 - c. Release the test button and verify that the Emergency Light goes out

- d. Press the alarm button again and verify that it still rings.

NOTE: SOME JOBS MAY HAVE THE EMERGENCY LIGHT UNIT ON TOP OF THE CAR AND REQUIRE THIS TEST TO BE DONE FROM THE TOP OF THE CAR. SEE "TOP OF CAR OPERATING {INSPECTION DEVICE}, INCLUDING STOP SWITCH, & LIGHT" IN THIS SECTION.

Ventilation

Check ventilation to ensure that it functions as intended by checking each fan speed.

Power Supplies

1. Turn OFF mainline disconnect using standard Lock-Out/Tag-Out procedures. (see Field Safety Handbook) Test to verify that mainline power is disconnected

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2. Check the mainline disconnects to verify proper operation and that it does disconnect power to the controller.
3. Visually check power panel relays, transformers, resistors, and boards for signs of excessive heat, loose or worn parts.
4. Check wire terminals, resistors, boards and power supplies for loose connections.
5. Visually check motor lugs.
6. Check fuses for proper sizing.
7. Check 120 VAC car lighting circuitry. Make sure lighting supply is properly identified.
8. Check controller for illegal jumpers.

Motor Lubrication (Dry Unit)

Lubricate motors as required based on the type of bearings, (see the motor nameplates, and motor application details.)

Motor Grounding

1. Turn OFF the mainline disconnect using standard Lock-Out/Tag-Out procedure. (See Field Safety Handbook)
2. With an ohmmeter, verify less than 1 ohm resistance for the incoming mainline disconnect ground to the controller.

NOTE: REPORT ANY CODE VIOLATIONS OBSERVED TO YOUR SUPERVISOR.

3. Check motor tag for specifications or possible life time bearings.
4. Lubricate motor per manufacturers' recommendations. Make sure to open relief plug, if provided.
5. Turn ON mainline disconnect using standard Lock-Out/Tag-Out procedures. (See Field Safety Handbook.)

Door Close Kinetic Energy

Kinetic Energy Test (Full Speed)

NOTE: KINETIC ENERGY CAN BE TESTED USING THE TIMING METHOD BASED ON LOCAL CODE REQUIREMENTS.

Door Timing Method

1. Measure the door opening from jamb to jamb.
2. Determine the minimum Code door closing time from tables 1,2, or 3 based on the type of doors.
 - a. Single speed, two speed
 - b. Center opening
 - c. Door material (standard or stainless)
3. For single speed or two speed doors, mark the sill 2" from each jamb.
4. For center opening doors mark the sill 1" from jamb and 1" from center point.
5. Time the doors on closing from one mark to the other.
6. Verify the times are greater than or equal to the minimum door closing time tables 1,2, or 3

NOTE: TABLE INFORMATION IS BASED ON ALL CODE DISTANCES PER ASME A17.1 RULE 112.4.

- Average closing speed in feet per second, is the code distance (in feet) divided by the closing time (in seconds).
- 7 ft lbf maximum allowable kinetic energy (full speed)
- 2.5 lb lbf maximum allowable kinetic energy (nudging speed)
- 7.5 lb sq ft for standard doors
- 8.5 lb sq ft for stainless doors
- 60 lbs hardware on single-speed door
- 112 lbs hardware on two-speed doors
- 100 lbs hardware on center opening doors
- ¼ ft lbf kinetic energy allowed for door operator
- 7 ft door heights

Kinetic Energy Test (Nudging Duty)

Door Gauge Method

1. Push the O-ring on the door gauge against the large end of the tube.
2. Enable Nudging Operation (if available)
3. Reduce the Nudging Timer value to 15 seconds.
4. Increase the Watchdog Fail Timer value (if available) to 100 seconds (maximum).
5. Open the door(s) and prevent them from closing with the safety edge until Nudging activates.
6. When Nudging operation starts, place one end of the gauge against the jamb (or leading edge of one of the doors on center opening) and align it so that the leading edge of the moving door will strike the gauge
7. With the gauge in position, allow the door(s) to strike the kinetic energy gauge at Nudging speed.
8. Remove the gauge and determine the kinetic energy based on the position of the O-ring as follows.
 - a. Locate the kinetic energy line that corresponds to the previously notes torque reading.
 - b. Follow the torque line until it intersects with the O-ring.
 - c. Follow the intersecting sloped line and read the kinetic energy scale.
9. Verify that the door kinetic force does not exceed the local code requirements.

Door Timing Method

1. Measure the door opening from jamb to jamb
2. Determine the minimum Code door closing time for tables 1,2, or 3 based on the type of doors
 - a. Single speed, two speed
 - b. Center opening
 - a. Door material (standard or stainless)
3. For single speed or two speed doors, mark the sill 2" from each jamb.
4. For center opening doors mark the sill 1" from jamb and 1" from center point.

5. Enable Nudging operation if available
6. Reduce the Nudging Timer value to 15 seconds (if available)
7. Increase the Watchdog Fail Timer value (if available) to 100 seconds (maximum)
8. Open the door(s) and prevent them from closing with the safety edge until Nudging activates.
9. When Nudging operation starts, time the doors on closing from one mark to another
10. Verify the times are greater than or equal to the minimum door closing time tables 1,2, or 3

NOTE: TABLE INFORMATION IS BASED ON ALL CODE DISTANCES PER ASME A17.1 RULE 112.4.

- Average closing speed in feet per second, is the code distance (in feet) divided by the closing time (in seconds).
- 7 ft lbf maximum allowable kinetic energy (full speed)
- 2.5 lb lbf maximum allowable kinetic energy (nudging speed)
- 7.5 lb sq ft for standard doors
- 8.5 lb sq ft for stainless doors
- 60 lbs hardware on single-speed door
- 112 lbs hardware on two-speed doors
- 100 lbs hardware on center opening doors
- ¼ ft lbf kinetic energy allowed for door operator
- 7 ft door heights

Door Time Data

		Minimum Door Closing Time (in Seconds)			
		Standard		Stainless	
Door Opening (inches)	Timed Code Distance (inches)	Full Speed	Nudging Speed	Full Speed	Nudging Speed
24	20	1.32	2.20	1.38	2.30
26	22	1.49	2.49	1.57	2.62
28	24	1.68	2.81	1.76	2.94
30	26	1.87	3.12	1.97	3.29
32	28	2.07	3.46	2.18	3.64
34	30	2.27	3.79	2.39	3.99
36	32	2.48	4.14	2.62	4.37
38	34	2.70	4.51	2.84	4.74
40	36	2.92	4.88	3.08	5.14
42	38	3.15	5.26	3.32	5.54
44	40	3.38	5.64	3.57	5.96
46	42	3.61	6.03	3.82	5.38
48	44	3.86	6.45	4.08	6.81

Table 1: Door Time Data Single Speed Door

		Minimum Door Closing Time (in Seconds)			
		Standard		Stainless	
Door Opening (inches)	Timed Code Distance (inches)	Full Speed	Nudging Speed	Full Speed	Nudging Speed
36	32	2.09	3.49	2.19	3.66
38	34	2.27	3.79	2.38	3.97
40	36	2.45	4.09	2.57	4.29
42	38	2.63	4.39	2.76	4.61
44	40	2.82	4.71	2.96	4.94
46	42	3.02	5.04	3.17	5.29
48	44	3.21	5.36	3.38	5.64
50	46	3.41	5.69	3.59	5.99
52	48	3.62	6.04	3.81	6.36
54	50	3.83	6.40	4.02	6.71
56	52	4.04	6.75	4.25	7.10
58	54	4.25	7.10	4.48	7.48
60	56	4.47	4.76	4.71	7.87
62	58	4.70	7.85	4.95	8.27
64	60	4.92	8.22	5.19	8.67
66	62	5.15	8.60	5.43	9.07

Table 2: Door Time Data – Two Speed Doors

				Minimum Door Closing Time (in Seconds)	
		Standard		Stainless	
Door Opening (inches)	Timed Code Distance (inches)	Full Speed	Nudging Speed	Full Speed	Nudging Speed
36	16	1.31	2.19	1.37	2.29
38	17	1.42	2.37	1.49	2.49
40	18	1.53	2.55	1.61	2.69
42	19	1.65	2.76	1.73	2.89
44	20	1.76	2.94	1.85	3.09
46	21	1.88	3.14	1.98	3.31
48	22	2.01	3.36	2.11	3.52
50	23	2.13	3.56	2.25	3.76
52	24	2.26	3.77	2.38	3.97
54	25	2.39	3.99	2.52	4.21
56	26	2.53	4.22	2.66	4.44
58	27	2.66	4.44	2.81	4.69
60	28	2.80	4.68	2.95	4.93
62	29	2.94	4.91	3.10	5.18
64	30	3.09	5.16	3.25	5.43
66	31	3.23	5.39	3.41	5.69

Table 3: Door Time Data – Center Opening Doors

Car Safety Device

1. Check the operation of any safety devices per the manufactures’ instruction (life jacket, rupture valve, etc.)
2. For single-speed or two-speed doors, mark the sill 2” from each jamb

Overhead, Car Top, & Hoisting Sheaves

Before taking the car out of service notify proper building personnel and place “out of service” signs at all landings (as required).

WARNING PRIOR TO ENTERING THE HOISTWAY ALL ACE SAFETY POLICIES MUST BE FOLLOWED! BEFORE STEPPING ONTO THE CAR TOP VISUALLY CHECK FOR EXCESSIVE GREASE OR OIL.

1. Run the car down from the top landing to access the top of car; place barricades as required.
2. Follow the OEM instructions for placing the elevator on car top inspection as noted in the “Top of Car Operating {Inspection} Devices Including Stop Switch & Light).
3. Refer to the manufacture’s product manual for inspection, lubrication, and maintenance, and adjusting procedures for overhead, car top, and counterweight sheaves.



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