

6.0 Electrical Energy

Cardinal Rule:

Always lock and tag out equipment when power is not required.

Always control live electricity and rotating equipment when working with close proximity (5ft) of the hazard.

6.1 Lockout and Tagout

Control of Hazardous Electrical Energy—General Rules

- Lock and Tag out and verify that the power source(s) has been removed when working on equipment where operation is not required, or employees place any part of their body within close proximity of unguarded energized circuits, rotating or oscillating parts the equipment must be completely de-energized.
- Personnel must be trained to perform lockout / tagout procedures and will have access to lockout tags and a lockout device.
- When removing elevators from service, ensure that there are no passengers in the car and that all proper signs have been posted.
- Never open the cover of a main line disconnect (refer to TIP 0.1.5-9) and do not perform work on the disconnect or beyond it (e.g., in electrical vaults, etc.).
- Install signs (p/n AAA102ADR1) on all elevator main line disconnects which reinforce the need to "stand to the side" when operating the handle (See TIP 0.1.5-4).
- When confronted with a disconnect that cannot be locked out using conventional methods or can be easily bypassed when a lock is in place, perform a written JHA with your supervisor. There are several types of devices on the market that will suit most situations depending on the conditions identified, such as circuit breaker lockout devices, chains, lock out bars, etc. Notify your supervisor so that the customer can be notified in writing of the conditions.
- Equipment using a 110 VAC power supply will be considered locked out if the plug is disconnected from the power source and controlled by the user.

OSHA states that there are two categories of individuals with respect to lockout, Authorized Employees and Affected Employees.

An "Authorized Employee" is a person who locks or tags out machines or equipment to perform service or maintenance on machines or equipment. They state further that Authorized Employees who are performing service and maintenance are required to initiate the lockout.

An "Affected Employee" is someone whose job requires him / her to operate or use a machine or equipment on which service or maintenance is being performed under lockout / tagout or whose job requires him / her to work in an area in which service and maintenance is being performed. It is the responsibility of the Authorized Employee to notify the Affected Employee(s) of the application or the removal of lockout / tagout devices. Notification shall be given before the controls are applied and after they are removed from the machine or equipment.

WARNING: Other trades may be doing work on a power source (e.g., electricians connecting main line feeders to controller). Always take the necessary steps to ensure control of the system while other trades are involved with a power source. Some examples include but are not limited to:

1. Disconnect wiring at a point that will provide you with control.
2. Communicate the issue to all concerned / affected workers.
3. Test function of lockout when you resume control of the main line disconnects.

If troubleshooting or testing must be performed with the power “ON,” refer to, Electrical Safe Work Practices. Once the problem is identified, shut off power and lockout before performing repair.

Personal and Group Locks

Personal locks are to be of keyed type, must have personal identification and are used to protect employees who are working on the elevator.

Group locks are installed to secure equipment and protect the public only. These can be a shared know combination and must include information on the reasoning for the Lock-Out.

Electrical Lock-Out Procedures

Who is required to lockout?

All individuals who are performing the work and affected by the work are required to lockout.

Required Equipment

- At a minimum 2 personal locks (one for the main line disconnect, and one for the 110VAC supply)
- At a minimum 1 group/ common lock
- At a minimum 1 multi-lock hasps to allow for multiple lockouts
- Personal ID Tags (can be accomplished with labels affixed to locks)
- 1000V CAT III Multimeter or approved voltage tester/sensor (contact testers must be rated for 1000V, non-contact testers may be rated for 600V)



Group Combination Lock
(VP-810400)



Personal LOTO Locks
(VP-810415)



Lockout / Tagout Procedure

1. Identify and locate the equipment that needs to be de-energized.
2. Notify all affected employees / customers as applicable that a lockout and tagout will be utilized and require affected personnel to apply their locks as required.
3. Shut off the mainline and other energy sources (e.g., lighting, fan circuits, signal power) as required.
4. Stand to the side, facing away from the disconnect(s). Operate the disconnect handle with the hand that places you in a position furthest from the disconnect(s). Avoid having your body directly in front of any disconnect when operating the handle.
5. **Lockout and tag all energy sources** with a personal lock and identification tag. If more than one individual is required to work on the equipment or is affected, each person must place their individual personal lock and tag on the energy isolating device.
6. Verify operation of meter or voltage tester on a known voltage source prior to use. To minimize the risk of inadvertent contact with hazardous electrical energy, the meter / tester must be tested



at a 110 VAC outlet outside the controller if available in the machine room. When 110 VAC outlet is not available in the machine room, the meter / tester can be tested in the controller at the 110 VAC source using safe electrical work practices (e.g., electrical temp guarding if necessary). If a proximity tester (sensor) is used, function tests of the proximity sensor must be performed before and after its use. It is acceptable to test a proximity tester on an electrical cord.

When interchanging meter leads or attachment during the Test & Verify process, continuity must be verified.

7. Use the meter or voltage tester to test each leg to ground. When using a meter, always clip the ground lead to a known ground source and use one hand with the needle probe to test each controller incoming feeds. Note: There have been instances where the main line disconnect has been shut off and locked out, but power has remained on. Disconnects have been known to fail. Test & Verify Tags VP-897955 should be placed on all incoming AC voltage sources terminated on the controller/transformer.

In some instances (main line, 110 VAC) power may remain on the controller or other equipment after a Lockout Tagout procedure has been performed. Under these circumstances be sure to check the equipment with a meter or test device to ensure all energy sources have been isolated (e.g., ERU/UPS, MRVF Batteries, capacitors and group interconnections). Always take the necessary precautions to protect yourself.

8. If more than one shift is involved to complete the work, the relief person should place his / her lock on the energy isolating device prior to the removal of the original lock and tag.

Return to Service

After all work is completed, the following procedures shall be used to restore the equipment to service:

1. Check the area for tools and other equipment before the lock and tag is removed.
2. Only the associate who performed the lockout may remove the lock and tag. If more than one individual placed a lock on the equipment, then each person must personally remove his / her own lock.

If an Authorized Employee leaves the work site and fails to remove his / her personal lock, contact your Supervisor if it is necessary to operate a piece of equipment which is locked out. Every effort must be made to locate the employee whose lock is on the equipment. If the Authorized Employee cannot be located and after positive assurance is made that no one is working on the locked out equipment, the supervisor may personally remove the lock or instruct another employee to do so.

The supervisor must remember that there is an inherent danger to the employee involved who may believe the equipment is still locked out, when actually it has been reactivated. The supervisor must assure that the equipment is once again locked out before the employee resumes work or inform the employee directly that the equipment has been released to operate.

3. Before leaving the area, notify all other Affected Employees that the work is complete.
4. Verify the proper operation of the unit prior to returning the unit to public service.

NOTE: When working on MRVF systems sixteen 12V batteries are connected in series and can generate up to 192 volts. Remember main line switch does not protect you from this hazard. Always remember to isolate the battery voltage prior to working on MRVF systems.