
M-604

Zmac/1000™
Traction Hoist
Rigging & Operations Manual



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Section 1. Rigging the Zmac/1000

Code of safe practices for suspended powered scaffolds

It shall be the responsibility of all users to read and comply with the following common sense guidelines which are designed to promote safety in the erecting, dismantling and use of Suspended Powered Scaffolds. These guidelines do not purport to be all-inclusive nor to supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions. If these guidelines in any way conflict with any state, local, provincial, federal or other government statute or regulation, said statute or regulation shall supersede these guidelines and it shall be the responsibility of each user to comply therewith.

I. General Guidelines

- A. Post these safety guidelines in a conspicuous place and be sure that all persons who erect, use, locate, or dismantle suspended scaffold systems are fully aware of them and also use them in tool box safety meetings.
- B. Follow all equipment manufacturers' recommendations as well as all state, local and federal codes, ordinances and regulations relating to suspended powered scaffolding.
- C. Survey the jobsite. A survey shall be made of the jobsite by a competent person for hazards such as exposed electrical wires, obstructions that could overload or tip the suspended powered scaffold when it is raised or lowered, unguarded roof edges or openings, inadequate or missing tiebacks. Those conditions should be corrected before installing or using suspended powered scaffold systems.
- D. Inspect all equipment before each use. Never use any equipment that is damaged or defective in any way, mark it or tag it as damaged or defective equipment and remove it from the jobsite.
- E. Erect and dismantle suspended powered scaffold equipment in accordance with design and/or manufacturer's recommendations.
- F. Do not erect, dismantle, or alter suspended powered scaffold systems unless under the supervision of a competent person.
- G. Do not abuse or misuse suspended powered scaffold equipment. Never overload platforms or hoists.
- H. Erected suspended powered scaffolds should be continuously inspected by the user to ensure that they are maintained in a safe condition. Report any unsafe condition to your supervisor.
- I. Never take chances! If in doubt regarding the safety or use of suspended scaffolds, consult your scaffold supplier.
- J. Never use suspended scaffold equipment for purposes or in ways for which it was not intended.
- K. Care should be taken when operating and storing equipment during windy conditions.
- L. Suspended powered scaffold systems should be installed and used in accordance with the manufacturer's recommended procedures. Do not alter components in the field.
- M. Suspended powered platforms must never be operated near live power lines unless proper precautions are taken. Consult the power service company for advice.
- N. Always attach fall arrest equipment when working on suspended powered scaffolds.
- O. Do not work on or install suspended powered scaffolds if your physical condition is such that you feel dizzy or unsteady in any way.

- P. Do not work on suspended powered scaffolds when under the influence of alcohol or illegal drugs.

II. Guidelines for erection and use of suspended scaffold systems

- A. Rigging
 1. Wear fall prevention equipment when rigging on exposed roofs or floors.
 2. Roof hooks, parapet clamps, outrigger beams, or other supporting devices must be capable of supporting the hoist machine rated load with a factor of safety of 4.
 3. Verify that the building or structure will support the suspended loads with a factor of safety of 4.
 4. All overhead rigging must be secured from movement in any direction.
 5. Counterweights used with outrigger beams must be of a non-flowable material and must be secured to the beam to prevent accidental displacement.
 6. Outrigger beams that do not use counterweights must be installed and secured on the roof structure with devices specifically designed for that purpose. Direct connections shall be evaluated by a competent person.
 7. Tie back all transportable rigging devices. Tiebacks shall be equivalent in strength to suspension ropes.
 8. Install tiebacks at right angles to the face of the building and secure, without slack, to a structurally sound portion of the structure, capable of supporting the hoisting machine rated load with a safety factor of 4. In the event tiebacks cannot be installed at right angles, two tiebacks at opposing angles must be used to prevent movement.
 9. Rig and use hoisting machines directly under their suspension points.
- B. Wire rope and hardware:
 1. Use only wire rope and attachments as specified by the hoisting machine manufacturer.
 2. Assure that wire rope is long enough to reach to the lowest possible landing.
 3. Clean and lubricate wire rope in accordance with the wire rope manufacturer's instructions.
 4. Handle wire rope with care.
 5. Coil and uncoil wire rope in accordance with the wire rope manufacturer's instructions in order to avoid kinks or damage.
 6. Tighten wire rope clamps in accordance with the clamp manufacturer's instructions.
 7. Do not use wire rope that is kinked, birdcaged, corroded, undersized, or damaged in any way. Do not expose wire rope to fire, undue heat, corrosive atmosphere, electricity, chemicals, or damage by tool handling.
 8. Use thimbles and shackles at all wire rope suspension terminations.
 9. Use J-type clamps or swedge fittings. Do not use U-bolts. Retighten J Clamps under load and retighten daily.
 10. Wire ropes used with traction hoists must have prepared ends. Follow manufacturer's recommendations.
- C. Power Supply:
 1. Ground all electrical power sources and power cord connections and protect them with circuit breakers.
 2. Use power cords of the proper wire size that are long enough for the job.

3. Power cord connections must be restrained to prevent their separation.
4. Use strain relief devices to attach power cords to the suspended scaffold to prevent them from falling.
5. Protect power cords at sharp edges.
6. Use GFI with power tools.

D. Fall arrest Equipment:

1. Each person on a suspended powered scaffold must be attached to a separate fall arrest system unless the installation was specifically designed not to require one.
2. Each lifeline must be fastened to a separate anchorage capable of holding a minimum of 5000 pounds.
3. Do not wrap lifelines around structural members unless lifelines are protected and a suitable anchorage connection is used.
4. Protect lifelines at sharp corners to prevent chafing.
5. Rig fall arrest systems to prevent free fall in excess of six feet.
6. Suspend lifelines freely without contact with structural members or building facade.
7. Use lifelines of size and construction that are compatible with the rope grab used.
8. Assure a properly attached rope grab is installed on each life line. Install in accordance with the manufacturer's recommendations.
9. Keep fall arrest device positioned above your head level.
10. Use only full body harnesses of the proper size and that are tightly fastened.
11. Assure full body harness has lanyard attachment with D-ring at the center of your back.
12. Consult fall protection supplier for inspection procedure. Inspect fall protection anchorage/equipment before each use.
13. When a secondary wire rope system is used, a horizontal lifeline secured to two or more structural members of the scaffold may be used in lieu of vertical lifelines.

E. During use:

1. Use all equipment and all devices in accordance with the manufacturer's instructions.
2. Do not overload, modify, or substitute equipment.
3. Before commencing work operations preload wire rope and equipment with the maximum working load, then retighten wire rope rigging clamps and recheck rigging to manufacturer's recommendations.
4. Inspect all rigging equipment and suspended power scaffold systems daily.
5. Inspect wire rope during each ascent or descent for damage.
6. Use care to prevent damage to equipment by corrosive or other damaging substances.
7. Clean and service equipment regularly.
8. Always maintain at least (4) four wraps of wire rope on drum type hoists.
9. Do not join platforms unless the installation was designed for that purpose.
10. Only move suspended scaffolds horizontally when not occupied.
11. When rigging for another drop assure sufficient wire rope is available before moving the suspended scaffold system horizontally.

12. When welding from suspended powered scaffolds:

- a. Assure platform is grounded to structure.
- b. Insulate wire rope above and below the platform.
- c. Insulate wire rope at suspension point and assure wire rope does not contact structure along its entire length.
- d. Prevent the bitter end from touching the ground.

Safety summary

Every year, workers on swing stages are injured, become disabled, or are killed because of carelessness or because they didn't understand how to properly operate the equipment. Don't become one of them. Know how to use this equipment and prevent accidents. Don't become one of them. Know how to use this equipment and prevent accidents. Don't operate equipment that you don't understand. You might cause accidents, resulting in injury or death to occupants or bystanders.

This instruction manual is not all-inclusive. It is impossible to anticipate every possible way this equipment may be used, and all possible hazardous situations. Therefore, it is very important that anyone using this equipment must determine for themselves whether the equipment is safe. You must be familiar with the operating characteristics of this hoist. You must understand how the hoist will interact with the characteristics of this hoist. You must understand how the hoist will interact with the characteristics of your application. You must be certain not to jeopardize yourself or others, or cause damage to the surroundings or the equipment. Call your local supplier if in doubt.

1. Read and understand this manual before using the equipment.
2. Use the troubleshooting guide in this manual to solve problems with the hoist. Understand the problem before attempting repairs. Never maintain or repair the equipment while the unit is suspended (above ground level). Repairs must only be made by people trained and authorized agent.
3. Be careful when operating the hoist in freezing temperatures, where water or moisture can enter the hoist overspeed brake or traction assembly.
4. Do not remove any parts from the hoist without replacing them. Do not change or substitute any approved hoist parts for parts that are not approved.
5. Use only approved wire rope, Crosby-type fist grips, thimbles, and other hardware recommended for this equipment.
6. Tighten and re-tighten wire rope fist grips after initial loading and before suspending the live load at the start of each work shift. Manufacturer recommended torque is 30 ft-lbs for $\frac{3}{16}$ -in. wire rope.
7. Use only solid counterweights designed for the beams being used. Never use sandbags, liquid filled containers, or any other free-flowing material as a counterweight.
8. Make sure the roof, parapet, or cornice you plan to use will support the rigging and suspended platform load with a safety factor of at least 4:1 over the rated hoist capacity. Do not attach to a weak or questionable structure. If in doubt, have a qualified engineer certify that the structure is capable of supporting the load.
9. Do not overload the hoist, platforms, or rigging. Do not exceed the rated capacity of any component.
10. Always use the rigging tie backs. Make sure roof rigging tie backs are as strong as the hoisting ropes, are installed without slack at right angles to the face of the building, and are secured to a structural member of the building.

11. **Warning!** Do not use single-point or two-point suspended scaffold unless:

- You are wearing a properly-attached fall arrest system.
- You have personally made sure that (1) the roof support system is complete, properly assembled, counterweighted (or otherwise anchored), tied off, and not overloaded; and (2) hoists and platforms are not overloaded.
- The wire rope is the size and type specified for your hoist.
- Guards are properly installed.
- The main suspension wire rope is vertical.

Setup and use must comply with Spider instructions, OSHA, and other applicable codes. Copies are available from Spider.

12. Do not reset the overspeed secondary brake if it actuates automatically while the work platform is off the ground. First, thoroughly check to determine the reason for brake operation. The overspeed secondary brake may be the only thing holding you up!
13. All electrical connections must be locked and supported by strain relief devices. The weight of electrical extensions must not be carried by the hoist power inlet plug. If strain relief devices are not included with your supply lines, contact your dealer to obtain them.
14. There are no adjustable or repairable parts in the brake motor, secondary brakes, and gear box. Only factory authorized personnel are qualified to make repairs to these components.
15. Do not use visibly worn, kinked, bird caged, undersized, or damaged wire rope. Protect wire rope from sharp or abrasive edges of buildings. Do not use wire rope that has been exposed to fire, excessive wear, corrosive atmosphere, chemicals, passage of electric current, or temperatures above 200°F.
16. Inspect the wire rope before rigging. Handle, inspect, and maintain wire rope carefully during and after each job. Lubricate the wire rope according to the manufacturer's recommendations.
17. Provide proper electrical grounding. Avoid arcing when using electrical equipment. When welding, insulate wire rope and a split and taped rubber hose about five feet above and below the hoist. When arc welding, provide a separate grounding wire capable of handling welding current and use an insulated rigging device to ground the wire rope.
18. Always check the soundness of the rigging before using this equipment. Go up and down a few inches several times near the ground to check equipment operation.
19. Never operate an electric hoist in an explosive atmosphere such as a refinery, chemical plant, grain elevator, coal mine or coal handling equipment, or around explosive organic vapors or dust.
20. Work from the deck of the work cage or platform only. Do not stand on stirrups, guardrails, toeboards, or other objects on the platform. Do not use ladders or boxes to get to higher elevations. Do not lean over the hoist or railings. Do not stand outside the hoist at the end of the platform unless end rails are in place.

21. Never operate a work cage or platform without guard rails, mid-rails, and toeboards in place. Use all personal protection equipment.
22. Never use aluminum platforms around caustic materials, acids, or acid fumes. Use approved corrosion-resistant platforms when corrosive materials are present.
23. Maintain clearances and make sure no obstructions interfere with vertical travel.
24. Avoid power lines. Make sure the platform or hand tools cannot swing or be blown within 10 ft. of a power line. Never, under any circumstances, rig a platform above electrical power lines.
25. Make sure the electrical cord is long enough to allow full travel of the suspended equipment. Use electrical cable restraining devices (kellum grips) to protect connections from tension.
26. Only use the operating switch by hand. Do not block or lock the operating switch in a running position.
27. When not in use, store hoist and stage beyond reach. Protect from unauthorized use. Cover the hoist if possible. Always unplug power cord.
28. Do not allow anyone under suspended equipment. If necessary, provide protection below the suspended equipment to prevent injury to people from falling objects. Use lanyards to secure tools and materials from falling on personnel below.
29. Use approved personnel harnesses, lanyards, rope grabs, and independent lifelines at all times. Attach the lifelines to a structural member of the building, never to part of the rigging.
30. Always operate the platform in a level position.
31. Never work alone on a suspended platform.
32. Hard hats must be worn at all times when servicing, erecting, disassembling, or using this equipment.
33. Comply with all local, state and federal safety codes and equipment.
34. Only authorized, properly trained, and physically fit personnel shall operate this hoist. Operator must not be subject to seizures or loss of control, and must not be under the influence of alcohol or drugs.
35. If you hear any strange noises such as ringing or if the hoist does not appear to work normally, stop immediately. Do not continue to use the equipment until it is repaired.

Warnings

If the hoist is suspended in the air and the motor runs but the wire rope does not move through the hoist, STOP the hoist immediately! Damaged wire rope may be jammed inside the hoist. Any attempt to move the hoist up or down could damage the equipment or cause injury or death.

Opening the Zmac/1000 control box can expose you to electric shock even if power has been disconnected. The Zmac/1000 starting capacitor can retain over 300 volts for extended periods of time after power has been disconnected.

Rigging essentials

Warnings

Rigging is the responsibility of the user. Do not attempt to rig a job unless you know how to do it properly. Contact your supplier, state safety inspector, or a professional rigger for rigging requirements. They will answer any rigging questions you may have.

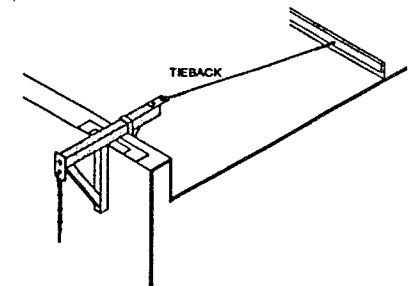
Use tie backs at all times and make sure the capacity of the rigging system is at least four times the rated capacity of the hoist. Failure to rig properly could result in serious injury or death.

1. Before selecting and installing a rigging system, make sure the cornice, parapet, or roof structure will support the weight of the suspended load and the rigging equipment, with a safety factor of at least 4:1. If in doubt, have a qualified rigging company install the system. Make sure the suspension wire rope remains vertical and that the suspension points are directly above the hoist entry guides or lead-in devices of the hoist at all times.
2. Current U.S. regulations do not require use of a second wire rope except in specific applications. However, for additional hazard reduction, Nihon Bisoh has provided an integral auxiliary overspeed brake to be used with a second wire rope.

We recommend using two wire ropes with each hoist. The second wire rope should be attached to a structural member of the building and protected from sharp edges.

Always check the rigging before using the equipment. Be sure fist grips are properly tightened. Place a load (equal to the weight of all workers and equipment that will be used on the stage) on one end of the platform and run the hoist up and down a few inches near ground level. Move the load to the other end of the stage and repeat the test. Re-tighten all fist grips while the wire ropes are under tension.

3. You must provide a separate lifeline for each person on the platform. The lifeline and tie off point must hold 5,400 lbs. The tie-off point must be a structural member of the building, not any part of the rigging. The lifeline must not touch rough or sharp edges.
4. Use only properly engineered parapet clamps and follow the manufacturers' instructions. Never attach to a parapet or similar type structure without a complete inspection and investigation of its structural strength by a qualified professional engineer. Do not attach to a weak or questionable structure. Always tie the parapet clamp back to a structural member of the building.



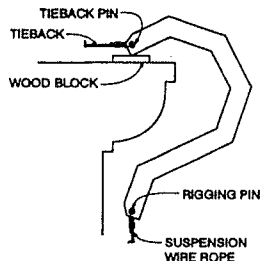
Cornice hook (700558-12 and 700558-12)

Cornice hooks support the vertically hung suspension wire rope of a staging from a cornice or parapet. Hook 700558-12 will fit a structure up to 12 in.; 700558-21 will fit up to 21 in.

Both models have a maximum rated working load of 1,250 lbs. when used in the cornice or point-loaded condition; 1,500 lbs. when used in the parapet-loaded condition. The parapet or cornice must be able to sustain the maximum rated working load with a safety factor of 4:1.

Assembly

1. Place the hook over the cornice or parapet wall with a block of wood between the point of the hook and the wall.
2. Attach the suspension wire rope to the hook with a shackle, and hold it away from the wall far enough to allow it to pass straight through the staging wire rope guide. You may need to use a standoff attachment. The standoff attachment can be supplied with your Spider hook.
3. Tiebacks with strength equivalent to the hoisting ropes shall be installed without slack at right angles to the building and firmly secured to a structurally sound portion of the building.



Parapet hook

Parapet hooks support the vertically hung suspension wire rope of a staging from a parapet. The parapet must be able to sustain the maximum rated load with a safety factor of 4:1.

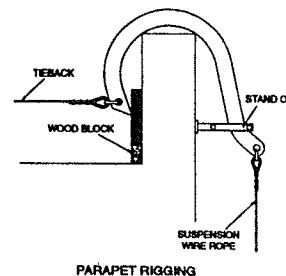
Model	Max. Parapet Thickness (in.)	Max. Load (lbs.)
SA-1086	13	1000
SA-1087	20	1000
700770-1	12	1500
700772-1	19	1500
700773-1	26	1500

WARNING

Do not point load the parapet hook.

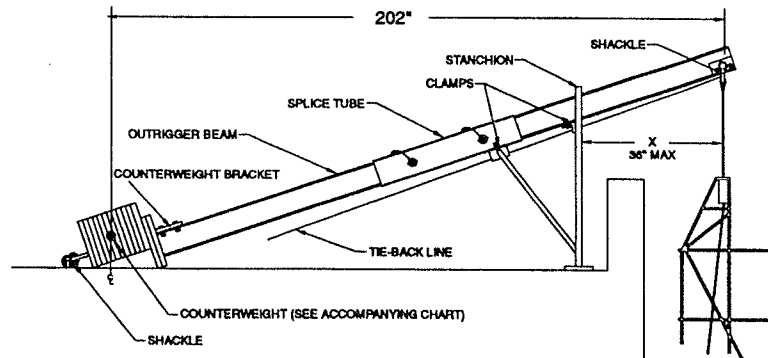
Assembly

1. Place the hook over the parapet wall, with a block of wood between the point of the hook and the wall.
2. Attach the suspension wire rope to the hook with a shackle, and hold it away from the wall far enough to allow it to pass straight through the staging wire rope guide. You may need to use a standoff attachment. The standoff attachment can be supplied with your Spider hook.
3. Tiebacks with strength equivalent to the hoisting ropes shall be installed without slack at right angles to the building and firmly secured to a structurally sound portion of the building. If the tieback cannot be installed at right angles to the structure face, two tiebacks, attached at opposing angles without slack, shall be attached to each rope supporting device to prevent movement in any direction.



Portable roof outrigger (SA-10841 and 700751-1)

This is a rigging device intended to support a vertically hung suspended wire rope of a staging from a flat roof or floor of a building. When properly counterweighted this device has a rated working load of 1,000-1,500 lbs. Care should be taken to ensure that the building structure is capable of supporting the rated load of the outrigger and counterweights.

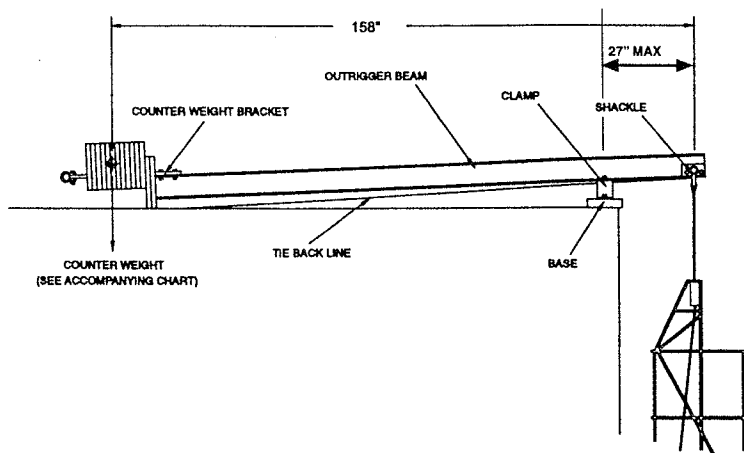


Assembling the 16-ft. split outrigger (700751-1)

1. Connect the two halves of the outrigger beam together with the splice tube and two hitch pin assemblies. The counterweight bracket goes up on one end and the 3/8-in. screw pin shackle hangs down on the other end.

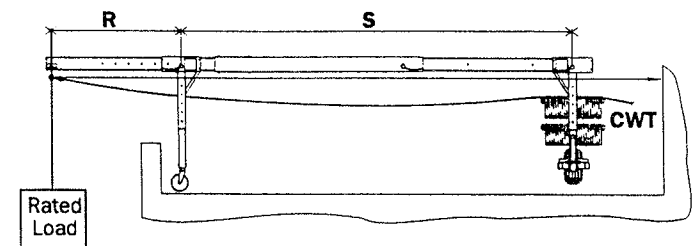
2. If using a stanchion, place it as close as possible to the parapet wall. The beam goes through the lowest position possible. The outrigger distance from the shackle to the stanchion should be kept as short as possible. Avoid cable guide pull in and do not exceed beam load/reach rating. (See label 4300 on your equipment.)
3. Tighten the clamps on the stanchion and the sway brace.
4. Determine the correct number of counterweights from counterweight chart label on the equipment. Place the first two counterweights down to support the end of the beam. The rest of the weight can be installed in the up position. Replace the shackle in the hole in the end of the bracket to ensure the weights don't accidentally slip off.
5. Install the suspension wire rope on the bolt-type anchor shackle. Make sure the shackle is installed in the hole at the end of the beam and the bolt and nut are secured and tightened.
6. Tiebacks with the strength equivalent to the hoisting rope must be installed from the suspension rope eye without slack, at right angles to the building, and be firmly secured to a structurally sound portion of the structure. This structure shall have the capability of supporting the maximum suspended load with a safety factor of not less than 4:1. In the event that the tieback cannot be installed at right angles to the structure face, two tiebacks, without slack, shall be attached to each rope supporting device to prevent movement in any direction.

Assembling the 12 ft. outrigger (SA-1088)



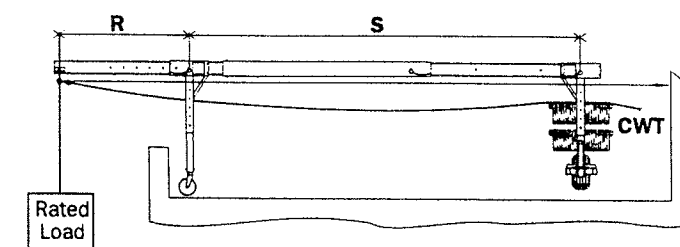
1. Clamp the wood block in place on the beam so there is enough thrust-out to allow the wire rope to pass straight through the cable guide. Place the block about 2 in. back from the edge of the structure being rigged. If used on a building parapet wall, be sure the beam is supported by the block and not by the inside edge of the wall. Do not exceed beam load/reach rating. (See label 4247 on your equipment.)
2. With the beam in place, determine how many 50-lb. counterweights are required for the thrust-out. Thread the first two counterweights onto the bracket so they support the end of the beam. The rest of the weights can be threaded onto the bracket so they are up off the deck. When all weights are installed, replace the shackle on the end of the bracket so the weights cannot accidentally slip off.
3. Install the suspension wire rope on the bolt type anchor shackle. Be sure the shackle is installed in the hole provided at the end of the beam and the bolt and nut are secured and tightened.
4. Tiebacks must be installed from the suspension rope eye without slack, at right angles to the building, and be firmly secured to a structurally sound portion of the structure. This structure shall have the capability of supporting the maximum suspended load with a safety factor of not less than 4:1. In the event that the tieback cannot be installed at right angles to the structure face, two tiebacks, without slack, shall be attached to each rope supporting device to prevent movement in any direction. (Tiebacks shall be at equivalent strength to the hoisting rope.)

Outrigger beam Counterweight Formula



1. Clamp the wood block in place on the beam so there is enough thrust-out to allow the wire rope to pass straight through the cable guide. Place the block about 2 in. back from the edge of the structure being rigged. If used on a building parapet wall, be sure the beam is supported by the block and not by the inside edge of the wall. Do not exceed beam load/reach rating. (See label 4247 on your equipment.)
2. With the beam in place, determine how many 50-lb. counterweights are required for the thrust-out. Thread the first two counterweights onto the bracket so they support the end of the beam. The rest of the weights can be threaded onto the bracket so they are up off the deck. When all weights are installed, replace the shackle on the end of the bracket so the weights cannot accidentally slip off.
3. Install the suspension wire rope on the bolt type anchor shackle. Be sure the shackle is installed in the hole provided at the end of the beam and the bolt and nut are secured and tightened.
4. Tiebacks must be installed from the suspension rope eye without slack, at right angles to the building, and be firmly secured to a structurally sound portion of the structure. This structure shall have the capability of supporting the maximum suspended load with a safety factor of not less than 4:1. In the event that the tieback cannot be installed at right angles to the structure face, two tiebacks, without slack, shall be attached to each rope supporting device to prevent movement in any direction. (Tiebacks shall be at equivalent strength to the hoisting rope.)

Outrigger beam Counterweight Formula



Calculate required pounds of counterweight using the following formula:

$$\text{counterweight} = \frac{4 \times \text{hoist rated capacity (lbs.)} \times \text{overhang (ft.)}}{\text{length (S)}} \quad (R)$$

Warning

Counterweights must be attached to the outrigger beam. Prevent removal with a padlock or similar device. Never use sandbags, liquid-filled drums, or other loose material as counterweights.

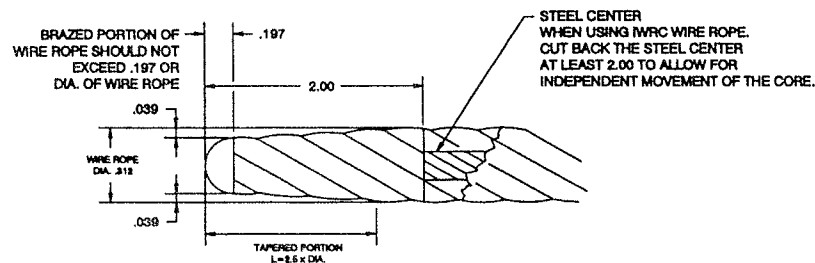
Always check the rigging before using the equipment. Be sure fist grips are correctly tightened. Place a load (equal to the weight of all workers and equipment that will be used on the stage) on one end of the platform and run the hoist up and down a few inches near ground level. Move the load to the other end of the stage and repeat the test. Re-tighten all fist grips while the wire ropes are under tension.

Wire rope

1. Use only 5/16-in., 6 x 19 Seale, IWRC, right regular lay, improved plow steel, preformed wire rope and bright or galvanized finish. Wire rope requires lubrication—under normal conditions, lightly lubricate it with a wire rope lubricant monthly, more often if necessary. For recommended vendors see applicable Access Operations Bulletin.
2. To prepare the wire rope for insertion, cut back the steel center at least 2 in. to allow for independent movement of the core. Braze and shape the end of the wire rope to form a smooth, tapered, bullet shape not longer than 2 1/2 times the diameter of the wire rope. DO NOT cool the end of the hot wire rope in water or oil. This makes the end brittle and may cause it to break off. Oil the bullet after it cools to prevent rusting.

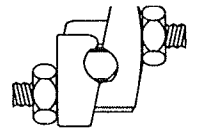
Caution

An improperly prepared bullet can cause the wire rope to jam in the hoist, or can prevent self-reeving of the wire rope.

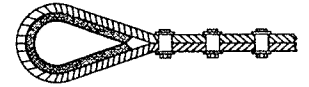


3. Always uncoil and carefully examine the wire rope before use. Worn, kinked, bird-caged, or damaged wire rope cannot be repaired—it must be replaced.

4. Use only proper diameter Crosby wire rope fist grips. Do not use "U" type wire rope clamps--these crush the wire and damage the rope. Tighten 5/16-in. fist grips to 30 ft-lbs.



5. When using the "J" style fist grip, use with a heavy-duty thimble and three fist grips per manufacturers instructions.

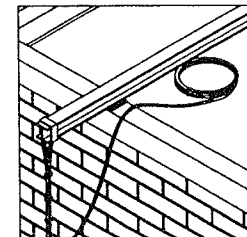
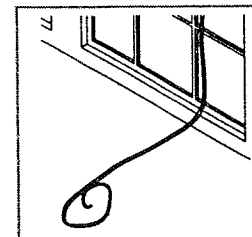


- a. Turn back the wire rope approximately 7 1/2" from the thimble. Apply first clip one base width from dead end of rope. Tighten nuts evenly, alternating from one nut to the other until reaching the recommended torque.
- b. Apply the second clip as near the thimble as possible. Install but do not tighten until after third clip is assembled.
- c. Place third clip equally between first two clips—take up rope slack—tighten nuts on all clips, alternating from one nut to the other until reaching the recommended torque.
- d. Apply load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next check and retighten nuts to recommended torque, prior to using equipment.

Warning

Because wire rope stretches when loaded, the diameter is reduced and the fist grips may loosen. Therefore, always re-tighten the wire rope clamps once a load has been applied. This is especially important at the start of each work shift.

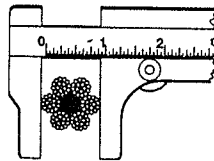
6. Be sure there is enough wire rope to have three feet extra on the lowest possible point to which the platform can travel.
7. Store extra wire rope on a roof, coiled and tied.
8. Equivalent connections to "J" style fist grips can be used. Check with Local Spider Branch.



9. If hoist travel is originated from above (near the suspension points such as from a bridge or over a manhole) and it is not possible to lower the platform to the ground, secure the tail line to prevent the platform from running off the suspension ropes. This is done by forming a thimble eye with Crosby clips and securing the tail end to the stirrup.

Before rigging in such an area, consult a safety professional. Additional protection equipment may be required.

10. Wire rope begins to wear the moment it is used. Therefore, it must be regularly inspected to be sure it is in good condition. Wire rope that is used beyond its useful life is dangerous to people and property. Wire rope MUST be taken out of service when ANY of the following conditions occur:
- Four (randomly distributed) broken wires in three lays, two broken wires in one strand, six broken wires in one rope lay.
 - More than one valley break (broken wire). A wire break in valleys between strands indicates an abnormal condition, possibly fatigue. Other broken wires may not be visible.
 - Kinked, crushed, bird caged wire rope, or any damage resulting in distortion of the rope structure.
 - Evidence of exposure to temperatures above 200°F.
 - Rusting, corrosion, or pitting.
 - Evidence of core failure (lengthening of a rope lay and a reduction in diameter).
 - A broken wire within 18 inches of the end attachments.
 - Reduction of wire rope diameter to 0.296 in. for a $\frac{5}{16}$ -in. diameter rope. Measure the diameter across the widest part of the strands, not the valleys, when the rope is under load.



Warnings

Do not expose the wire rope to fire, temperatures above 200°F, passage of electrical current, or corrosive atmospheres and chemicals. This exposure will make the rope unsafe.

Acids will corrode and reduce the strength of both the inner and outer strands. When using corrosive chemicals, use stainless steel wire rope and discard after completing the project, or if any damage is evident. Do not save wire rope that has been in contact with corrosives. When in doubt, replace the wire rope.

Suspended scaffold check list

To properly operate this hoist, you must be able to answer "yes" to everything on this list. Do not use the scaffold until you know how.

- Read and understand:**
 - The manufacturer's operating and instruction manual(s)
 - The scaffold industry safety rules
 - OSHA and all other federal, state, and local safety standards, requirements, and ordinance relative to your job
- Roof support system:**
 - The parapet and other building parts are strong enough.
 - A qualified, responsible person has determined how many counterweights are needed for a 4:1 safety margin. The right number of weights are bolted to the beam and can't come off.
 - Roof beams, clamps, or hooks are tied back to strong, safe parts of the building.
 - Roof beams meet safety requirements and are assembled correctly.
- Scaffold platform:**
 - All parts (stirrups, decks, rungs, rails, bumper rollers, welds/connections, toe boards, guard rails and all other parts) are sound and properly secured.
 - The load you are lifting is less than the ratings marked on the platform, hoists, and roof beams.
 - The stirrups are exactly under the roof supports and the wire ropes hang straight down.
- Hoist operation**
 - A copy of the manufacturer's operating instructions is on the stage. You have read all instructions and understand them.
 - The hoists have been properly maintained and serviced. The instruction labels and signs on the hoists are clear and readable. You have read and understand these labels.
 - All wire ropes have been inspected and are in good condition. They are long enough to reach the ground and are clamped tight at the top. Any extra rope is coiled at the top to protect it from damage.
 - As you first lift the load a few feet, make sure the hoist acts and sound normal. Recheck all bolts and wire rope clamps.
 - The electric cable is sound and strain relief devices have been used at the connections. The power cord is of adequate size and the voltage supplied to the motor is correct.
- Fall arrest system:**
 - Be sure that before anyone steps onto the scaffold, they are properly attached to a lifeline.
 - Each person on the scaffold has a separate lifeline system.
 - Lifelines are inspected and are attached to a structural member of the building other than the rigging. Lines are protected from sharp corners such as roof edges.
 - Rope grabs are the proper size for the lifelines, have been tested, and operate properly.
 - Harnesses have been inspected. Lanyards are attached correctly to the rope grabs and to the "D" rings at the center of the operator's back.
- Additional checks**
 - The scaffold, rigging, lifelines, wire ropes, or work tools are at all times more than 10 feet away from power lines.
 - The equipment is being used only in low wind and good weather with the platform secured to reduce sway.
 - The rigging is inspected every day, and before using the equipment after moving it.
 - The platform, hoist, or rigging is loaded to the rated capacity only. The platform should remain level as you travel up and down.
 - The equipment moves normally, making no strange noises. If not, stop where you are and wait for help.

Failure to follow all rules, safety codes, and practices may result in accidents with injury or death to operators and bystanders.

2. Controls, indicators, & other hoist components

Emergency stop button

Pressing this red button (located beneath the control panel) cuts all power to the electric motor. When power is cut, the electromagnetic brake automatically engages to hold the hoist firmly to the wire rope.

Up/down control buttons with power indicator light

Control the vertical motion of the hoist. The buttons disengage when released. A bright, steady power indicator light means electrical power is sufficient; absence of light or a dim or flickering light means electrical power is inadequate.

Overspeed reset knob

Used to reset the overspeed brakes. Overspeed brakes can only be reset once the suspended load has been removed from the overspeed brakes mechanism. The knob is reset only by hand. NEVER reset this knob using any type of tool.

Overspeed brake manual trip button

This trip button manually activates the overspeed brake.

“No power” control descent device

Pull the control descent manual lever when electrical power to the hoist is lost. This allows the hoist to be lowered gradually.

Hour meter

Shows the number of hoist operating hours.

Pendant switch receptacle

Allows the use of an up/down remote control pendant switch. When not using the pendant switch, keep the receptacle closed by twist-locking the attached waterproof cap.

Main wire rope inlet

For inserting the main suspension wire rope. See *Wire Rope* and *Wire Rope Reeving* in this manual for instructions.

Secondary wire rope inlet

Used for inserting the secondary wire rope in four-wire installations. This rope is not used to raise or lower the hoist. The hoist is equipped with a secondary wire rope overspeed brake; see instructions on testing and using BISOLOCK dual overspeed brake.

Overspeed Inspection windows

Used to visually inspect that both BISOLOCK brakes are working before using the hoist. Never use the hoist if the overspeed brake mechanisms visible in the windows are not rotating.

Mounting hole

This .65 in. (16.5 mm) hole is used to mount the hoist to most standard suspended scaffolds using dealer-supplied mounting adapters.

Side guard

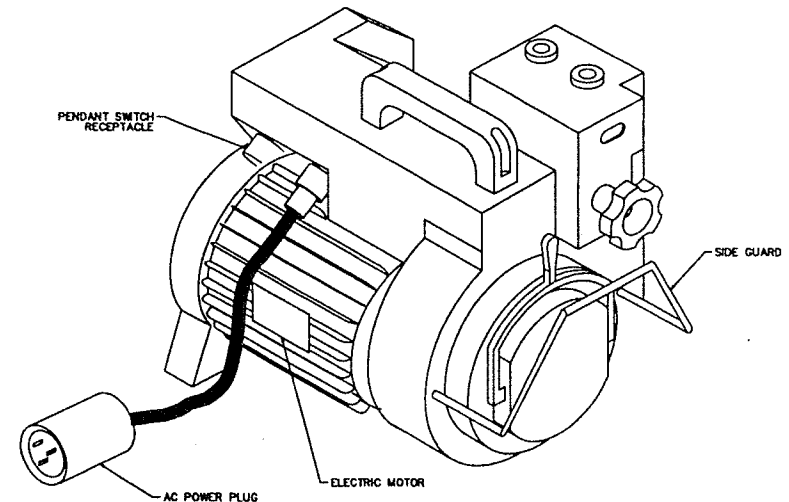
This guard protects the end of the hoist.

Electric motor

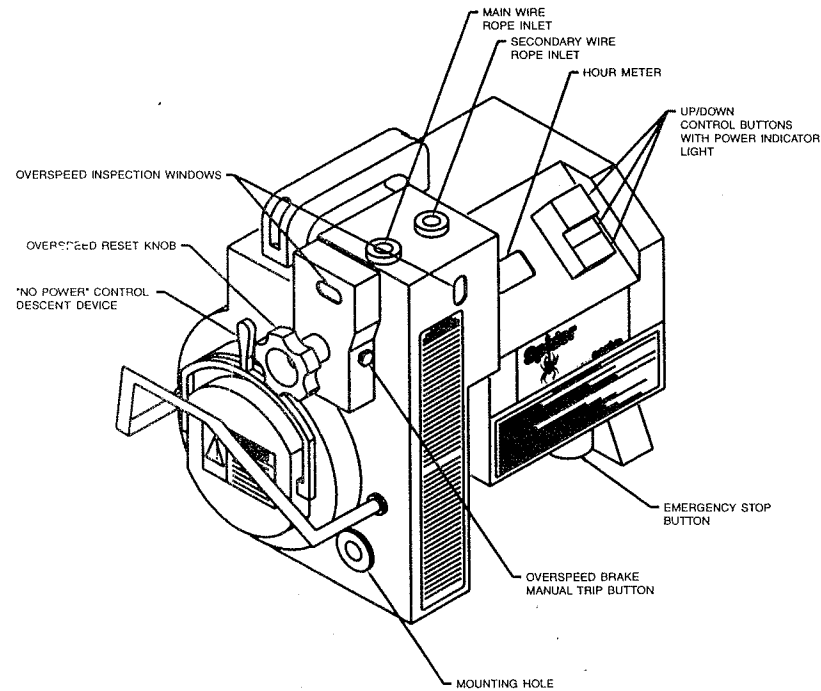
The Zmac/1000 uses a custom-designed, lightweight and compact motor to provide a full 1000 lbs. lifting capacity.

AC power plug

This 3-prong power plug and pigtail cable are for connecting the hoist to the worksite power supply.



Controls, indicators, & other hoist components



Section 3. Specifications

Hoist specifications

Capacity	1000 lbs.
Speed	35 fpm
Weight	72 lbs.
Voltage	208V AC single phase/60hz
Current	8 amps
Required circuit breaker	20 amps (for 2 hoists)

Recommended power cable

Type designation	SO or SOW
AWG size	10/3 AWG
Voltage rating	600V AC

Environment

Temperature	-10°C to 40°C
Humidity	Less than 85%
Pressure	atmospheric
Wire rope construction	6 X 19 IWRC only
Wire rope diameter	5/16-in. (+5% to -5% size variation allowed)

Cautions

Voltage must be $\pm 10\%$ of 208V for proper operation. Make sure power indicator light is lit and recommended power cables are being used. Check that adequate line voltage is present at suspended platform.

Due to the various suspended platform loading situations and electrical voltage sources, it is not possible to specify the exact maximum power cable length.

The hoist should be serviced by an authorized Zmac/1000 agent every 100 hours of use or annually.

Section 4. Set-up instructions

Warnings

Set-up operations must be performed at ground level. Never set-up the hoist or make modifications to the set-up while suspended.

All bolts and fasteners must be SAE Grade 5 or better.

The Zmac/1000 is not rated for use in an explosive atmosphere.

No two electric traction hoists have the same operating characteristics or location of safety feature controls. Therefore, never use different manufacturer's hoists on the same platform. Only replace a Zmac/1000 hoist with another Zmac/1000 hoist of the same performance specifications.

The Zmac/1000 is easily mounted on most standard suspended platform stirrups using the dealer-supplied mounting adapter. The adapter connects between the .65-in. (16.5 mm) hole at the bottom front of the casing and the stirrup mounting hole. After mounting the hoist, make sure the wire rope can freely exit the hoist and is not blocked by any part of the adapter, stirrup, or suspended platform.

Power connections

1. Make sure the hoist emergency stop button and Bisolock dual overspeed brakes are all reset.
2. Connect the Zmac/1000 to the power supply using the power cable with the twist-lock plug.

Caution

Disconnect the power cable when not using the hoist or when leaving the suspended platform unattended.

3. Make sure the power indicator light is lit.
4. Press the UP button, then the DOWN button to make sure the hoist motor has power and runs.
5. Make sure the power supply has sufficient power capacity and circuit breaker (or fuse) size (see Specifications).
6. Use recommended power cable (see Specifications.) If the cable is longer than 400 feet use a booster transformer to compensate for voltage drop:
 - 1 motor: each 100-ft. of power cable = drop is approximately 2 volts
 - 2 motor: each 100-ft. of power cable = drop is approximately 4 volts

Cautions

Make sure the voltage supplied to the hoist is within the range listed (see Specifications). Applying too high a voltage can damage the hoist.

To reduce the effect of voltage drop, avoid starting both hoists on a suspended platform at exactly the same time.

Pendant switch (optional)

Warning

Do not push the pendant switch UP/DOWN buttons at the same time you push the control panel UP/DOWN buttons.

The pendant switch allows remote control of the Zmac/1000 vertical motion. Use only recommended pendant switch as provided by your authorized Zmac/1000 agent. The pendant switch connects to a waterproof mil-spec receptacle at the rear of the control panel.

Pendant switch assembly

1. Remove the receptacle cap and insert the pendant switch cable connector into the receptacle.
2. Test hoist operation with the pendant switch by raising and lowering the suspended platform a few inches.
3. When not using the pendant switch, cover the receptacle at the rear of the control panel by twist-locking the attached waterproof cap.

Wire rope reeving

1. Make sure the overspeed brakes are reset by turning the reset knob clockwise until the brakes reset.
2. Insert the bullet end of the wire rope approximately 9 in. into the top of the hoist. (See "Wire rope" in Section 1 for the correct wire rope to use, and how to make a wire rope bullet.)

Caution

Make sure the wire rope exits the bottom of the hoist and runs freely through the bottom of the suspended scaffold. Do not block the exit route of the wire rope—this can jam the wire rope inside the hoist and prevent operation.

3. Press the UP button on the control panel while firmly pushing the wire rope into the hoist. The hoist will begin self-reeving.

Warning

If the wire rope doesn't move freely through the hoist, STOP IMMEDIATELY. Operating the hoist with a blocked, kinked or jammed wire rope can cause serious damage to the hoist or wire rope and serious injury to personnel.

Electromagnetic brake with control descent

The Zmac/1000 is equipped with a "No Power" control descent that allows it to be safely and gradually lowered when electric power is lost. Test the control descent function daily before use. See the test procedures below and carefully read the warnings, cautions, and instructions.

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Warnings

Set-up operations must be performed at ground level. Never set-up the hoist or make modifications to the set-up while suspended.

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Power connections

1. Make sure the hoist emergency stop button and Bisolock dual overspeed brakes are all reset.
2. Connect the Zmac/1000 to the power supply using the power cable with the twist-lock plug.

Caution

Disconnect the power cable when not using the hoist or when leaving the suspended platform unattended.

3. Make sure the power indicator light is lit.
4. Press the UP button, then the DOWN button to make sure the hoist motor has power and runs.
5. Make sure the power supply has sufficient power capacity and circuit breaker (or fuse) size (see Specifications).
6. Use recommended power cable (see Specifications.) If the cable is longer than 400 feet use a booster transformer to compensate for voltage drop:
 - 1 motor: each 100-ft. of power cable = drop is approximately 2 volts
 - 2 motor: each 100-ft. of power cable = drop is approximately 4 volts

Cautions

Make sure the voltage supplied to the hoist is within the range listed (see Specifications). Applying too high a voltage can damage the hoist.

To reduce the effect of voltage drop, avoid starting both hoists on a suspended platform at exactly the same time.

Pendant switch (optional)

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Do not push the pendant switch UP/DOWN buttons at the same time you push the control panel UP/DOWN buttons.

The pendant switch allows remote control of the Zmac/1000 vertical motion. Use only recommended pendant switch as provided by your authorized Zmac/1000 agent. The pendant switch connects to a waterproof mil-spec receptacle at the rear of the control panel.

Pendant switch assembly

1. Remove the receptacle cap and insert the pendant switch cable connector into the receptacle.
2. Test hoist operation with the pendant switch by raising and lowering the suspended platform a few inches.
3. When not using the pendant switch, cover the receptacle at the rear of the control panel by twist-locking the attached waterproof cap.

Wire rope reeving

1. Make sure the overspeed brakes are reset by turning the reset knob clockwise until the brakes reset.
2. Insert the bullet end of the wire rope approximately 9 in. into the top of the hoist. (See "Wire rope" in Section 1 for the correct wire rope to use, and how to make a wire rope bullet.)

Caution

Make sure the wire rope exits the bottom of the hoist and runs freely through the bottom of the suspended scaffold. Do not block the exit route of the wire rope—this can jam the wire rope inside the hoist and prevent operation.

3. Press the UP button on the control panel while firmly pushing the wire rope into the hoist. The hoist will begin self-reeving.

Warning

If the wire rope doesn't move freely through the hoist, STOP IMMEDIATELY. Operating the hoist with a blocked, kinked or jammed wire rope can cause serious damage to the hoist or wire rope and serious injury to personnel.

Electromagnetic brake with control descent

The Zmac/1000 is equipped with a "No Power" control descent that allows it to be safely and gradually lowered when electric power is lost. Test the control descent function daily before use. See the test procedures below and carefully read the warnings, cautions, and instructions.

Do not use the control descent for normal descending. It is intended for emergency descent when there is no electrical power available to the hoist. Therefore, it is important for the operator to fully understand how to operate the control descent correctly and safely.

Warnings

Never operate the control descent while operating the up/down buttons. Before raising or lowering the hoist, make sure the control descent manual release lever is in the vertical position. Failure to follow this warning can result in serious injury.

If the control descent does not operate correctly when the manual release lever is activated, DO NOT use the hoist until it has been repaired and re-tested.

If descent speed is greater than 1.5 times (52.5 fpm) the normal descent speed when the control descent is activated, DO NOT use the hoist until the control descent device has been repaired and re-tested.

Never allow oils or paints to come in contact with the electromagnetic brake. Oils, paints or similar fluids can cause a reduction in brake torque, uncontrolled descent, brake lock or the inability to raise or lower the hoist.

Never perform maintenance, overhauls or repairs on the electromagnetic brake at the work site or while suspended. Contact your authorized Zmac/1000 agent.

Do not touch the electromagnetic brake while operating the hoist. The surface of the brake can reach temperatures of 90 to 100°C, and can burn exposed skin.

Cautions

When using the control descent function during power-off operations, stop every 10 feet or so for a few seconds.

Do not exert excessive pressure on the control descent manual release lever. This can damage the lever and prevent proper operation.

Overspeed brake

The Zmac/1000 is equipped with dual BISOLOCK overspeed brakes (the secondary overspeed brake is used with four-wire suspension systems). The brakes are designed to grip the wire rope to stop and hold the suspended platform when the suspended platform descent speed has exceeded a safe rate.

- In normal operation, check the overspeed brakes daily before use.
- In contaminated environments, check the overspeed brakes often during use.

The operator must fully understand the operation and daily test procedures for the overspeed brakes. Read the following warnings and instructions carefully and perform the tests *daily*. Failure to follow these warnings and instructions can result in serious injury.

The overspeed brakes can be activated by:

- Overspeed conditions
- Activating the manual trip button
- Sudden movement of workers on the platform
- Sudden or repeated shock loads

Warnings

Do not try to reset the overspeed brakes if activated because of an overspeed condition. Rescue workers on the platform, then contact your authorized Zmac/1000 agent. **DO NOT use the hoist until the overspeed brakes have been re-tested by an authorized Zmac/1000 agent.**

The internal wedge must be replaced after the brake has been activated under load. Wedge replacement can only be done by an authorized Zmac/1000 agent. **NEVER perform any repairs, maintenance, or parts replacement while suspended.**

If the overspeed brakes activate for any reason other than an overspeed condition, carefully check the condition of all platform equipment, including the hoist, overspeed brakes and wire rope. **DO NOT use the hoist until the condition that caused the overspeed brakes to activate has been identified and corrected.**

DO NOT use the hoist when cam-wheels are not visibly turning inside the inspection windows with wire rope inserted.

Section 5. Daily test & inspections

Inspect the following components carefully:

- wire rope
- power cable
- rigging
- suspended platform
- Zmac/1000 hoist

Follow daily test procedures as described below.

Warnings

NEVER perform maintenance, repairs or part replacement on the Zmac/1000 while suspended.

Inspect all components of the suspended platform to make sure there are no signs of damage or excessive wear and that all fastenings (nuts, bolts, clamps, etc.) are properly and securely tightened.

Caution

Never reset the BISOLOCK dual overspeed brakes using tools, such as wrenches or pliers. **ONLY** reset by hand, turning the reset knob clockwise until the overspeed brakes reset.

Work environment

Many work environments contain contaminants that could negatively affect the performance of the hoist and the BISOLOCK main and secondary overspeed brakes. When contaminants such as paint, epoxy, cement, corrosive chemicals or sand blasting are present at the work site, frequently perform the daily test to ensure that the hoist is operating properly.

Your authorized Zmac/1000 agent can supply a protective cover, which is recommended for use in contaminated environments.

Warnings

The protective cover may obstruct some or all of the safety warning and instruction labels on the hoist. Before operating a hoist equipped with a cover, the operator must remove the cover and read and understand all the labels on the hoist. Each new operator of the hoist must fully understand all warning and instruction labels before operating the hoist.

Caution

Prolonged use of the Zmac/1000 hoist with a protective cover in place could result in the hoist overheating due to restricted air supply to the motor fan. When using a protective cover, check often that the fan has unobstructed air supply or occasionally stop the hoist to allow the motor to cool.

Lifting test

Conduct this test daily before using the Zmac/1000 hoist.

Warning

If the wire rope doesn't move freely through the hoist, STOP IMMEDIATELY. Operating the hoist with the wire rope blocked, kinked, or jammed can cause serious damage to the hoist and/or the wire rope and serious injury to personnel.

Lifting test procedure

1. While suspended just above the ground, raise the platform about 3 ft., then lower it to the original position. Repeat several times.
2. Press the emergency stop button to confirm that it cuts off all power to the hoist.
3. Make sure the power indicator light is not lit.
4. Press the UP/DOWN buttons to confirm that the hoist will not operate.
5. Reset the emergency stop button by pulling the button down, Power should now be restored to the hoist.
6. Check that the power indicator light is lit.

Electromagnetic brake with control descent

The Zmac/1000 hoist is equipped with a "no power" control descent function that allows the unit to be safely and gradually lowered when electric power is lost to the motor. Test the control descent daily before use. Refer to the test procedures below.

Warnings

Use the control descent only when a power failure prohibits up and down movement. Do not use the control descent device for normal descending.

If the control descent fails to operate correctly when the manual release lever is activated, DO NOT use the hoist until the control descent has been repaired and re-tested.

If descent speed is greater than 1.5 times (52.5 fpm) the normal descent speed when the control descent is activated, DO NOT use the hoist until the control descent has been repaired and re-tested.

NEVER operate the control descent while operating the up/down buttons. Before raising or lowering the hoist, make sure the control descent manual release lever is in its normal vertical position. Failure to follow this warning can result in serious injury.

NEVER allow oils or paints to come in contact with the electromagnetic brake. This can cause a reduction in brake torque, uncontrolled descent, brake lock or the inability to raise or lower the hoist.

NEVER perform maintenance, overhaul, or repairs on the electromagnetic brake at the work site or while suspended. Contact your authorized Zmac/1000 agent.

DO NOT touch the electromagnetic brake while operating the hoist. The surface of the brake can reach temperatures of 90 to 100°C, and can burn exposed skin.

Cautions

When using the control descent function during power-off operations, stop every 10 feet or so for a few seconds.

Do not exert excessive pressure on the control descent function manual release lever. This can deform the lever and prevent it from operating properly.

Test procedures

1. Raise the scaffold about 3 ft. above the ground.
2. Press the emergency stop button to disconnect power to the hoist.
3. Carefully and slowly pull out on the control descent lever on the electromagnetic brake.
4. The hoist should descend at a controlled speed not greater than 1.5 times (52.5 fpm) the normal descent speed.

Overspeed brake

The Zmac/1000 is equipped with BISOLOCK dual overspeed brakes for main and secondary wire ropes. The secondary overspeed brake is used with four-wire rigging systems. Using four-wire rigging systems is advised when possible; however, four-wire rigging is not required by current applicable regulations.

Read and adhere to the following instructions:

1. Test overspeed brakes daily before using the hoist. Refer to the test procedures below.
2. The overspeed brakes can be activated by:
 - Overspeed conditions
 - Tripping the manual trip button
 - Sudden movement of workers on the platform
 - Sudden or repeated shock loads
3. Carefully and slowly pull out on the control descent lever on the electromagnetic brake.

Warnings

- | |
|--|
| <p>Do not try to reset the overspeed brakes if they have been activated because of an overspeed condition. Rescue the occupants on the platform, then contact your authorized Zmac/1000 agent. DO NOT use the hoist until the overspeed brakes have been repaired and re-tested.</p> |
| <p>If the overspeed brakes activate for any reason other than an overspeed condition, carefully check the condition of all platform equipment, including the hoist, overspeed brakes and wire rope. DO NOT use the hoist until the condition that caused the brakes to activate has been identified and corrected.</p> |
| <p>If either of the overspeed brakes does not activate when tested, DO NOT use the hoist until the overspeed brakes have been repaired and re-tested.</p> |
| <p>DO NOT use the hoist when the cam wheels are not visibly turning within the overspeed brake inspection windows with wire rope inserted.</p> |

Test procedures

Test 1: Main overspeed brake test

- Make sure both main and secondary brakes are reset. Insert about 9-in. of wire rope into the main wire rope inlet (main overspeed brake inlet), then quickly pull on the wire rope. The brake should activate and lock on the wire rope.
- After testing, reset the overspeed brakes by turning the reset knob clockwise until the brakes reset.

Test 2: Secondary overspeed brake test

- Make sure both main and secondary brakes are reset. Insert about 9-inches of wire rope into the secondary wire rope inlet (secondary overspeed brake inlet), then try to quickly withdraw the wire rope. The secondary overspeed brake should activate and lock on the wire rope.
- After testing, reset the overspeed brakes by turning the reset knob clockwise until the brakes reset.

Test 3: Main overspeed brake descent test

- Raise the platform about 3 feet. Push the manual trip button and pull the control descent lever manual release. The main overspeed brake should activate and lock the wire rope.

- Press the DOWN button to confirm that the hoist does not descend.
- If the test is successful, raise the platform about 2 inches using the UP button. Then reset the brakes by turning the reset knob clockwise until the brakes reset.

Section 6. Troubleshooting

The following information is intended to help identify faults that can occur and recommended correction(s). If problems exist, call your authorized Zmac/1000 agent. All repairs must be done by an authorized agent.

Warnings

DO NOT perform any maintenance, repair, or part replacement on the hoist when it is suspended or is under load.

<i>1. Power indicator light does not light</i>	
No power at junction box.	Check power.
Building circuit breaker tripped or fuse blown.	Check circuit breaker
Power cable unplugged.	Plug in power cable.
Emergency power off button is not reset.	Reset emergency power off button. Pull down to reset.
Indicator light is burned out.	Return Zmac/1000 to authorized service agent.
Power voltage is low.	Check the voltage as listed in <i>Specifications</i> and use a booster transformer to compensate for voltage drop or reconfigure power cables to ensure proper voltage.
<i>1. Power indicator light is on, but the electric motor will not run</i>	
Overspeed reset knob has not reset.	Make sure it is not a safety problem, then reset the overspeed reset knob.
If the motor is hot, the thermal protective switch may have tripped and disconnected power to the motor.	Voltage too high or too low. Check <i>Specifications</i> . Let motor cool for at least 30 minutes, then restart the hoist.
Electromagnetic brake drags.	Return Zmac/1000 to an authorized service agent.

3. *Electric motor runs, but Zmac/1000 will not self-reeve.*

Inadequate bullet on the wire rope.	Make a correct rope-end bullet.
Bent or kinked wire rope.	Replace wire rope.
There is dirt or other contaminant in the Zmac/1000	Return Zmac/1000 to an authorized service agent

4. *Zmac/1000 runs in only one direction.*

Failure of electrical circuit.	Return Zmac/1000 to an authorized service agent.
Overspeed reset knob is not reset.	Make sure it is not a safety problem, then reset the overspeed reset knob.

5. *Electric motor runs and hoist self-reeves, but will not lift.*

Using incorrect wire rope.	Make sure the proper wire rope is used. See <i>Specifications</i> .
Wire rope is worn or damaged.	Replace wire rope.
Wire rope is worn and jammed inside the hoist.	Clear jam and replace wire rope.
Traction sheave is worn.	Return Zmac/1000 to an authorized service agent.
Gear drive is worn.	
There is dirt or other contaminants in the Zmac/1000.	

6. *Zmac/1000 overspeed brakes cannot reset.*

Overspeed condition. Overspeed brake(s) have activated under load.	Warning: NEVER try to reset the overspeed brakes after they have activated in an overspeed situation. Rescue the workers on the platform. Contact your authorized Zmac/1000 agent.
Descending after tripping the manual trip button	Raise the platform about 2-in. to reset the overspeed brakes. Turn the reset knob clockwise until the brakes reset.
Sudden movement of workers on the platform has tripped overspeed brake(s).	
Sudden and repeated shock loads.	

7. *Hoist does not stop immediately when up/down button is released.*

Electromagnetic brake or electrical circuit may be damaged.	Return Zmac/1000 to an authorized service agent.
Brake may be worn.	

8. *Hoist does not stop immediately when emergency stop button is pressed.*

Electromagnetic brake or electrical circuit may be damaged.	Return Zmac/1000 to an authorized service agent.
Electromagnetic brake may be worn.	

9. *Hoist makes grinding, squealing, or other unusual noise.*

Gearbox may be inadequately lubricated or be damaged.	Return Zmac/1000 to an authorized service agent.
Electric motor fan or fan cover damaged.	
There is dirt or other contaminants in the hoist.	

10. *Hoist speed is too slow.*

Power voltage is too low	Check that voltage is correct (see <i>Specifications</i>). Use a booster transformer to compensate for voltage drop or reconfigure power cables to ensure correct voltage.
Electromagnetic brake is dragging.	Return Zmac/1000 to an authorized service agent.
Wire rope is jammed inside hoist.	Return Zmac/1000 to an authorized service agent.

Section 7. Zmac / 1000Air

Zmac / 1000Air Powered Hoist

SPECIFICATIONS

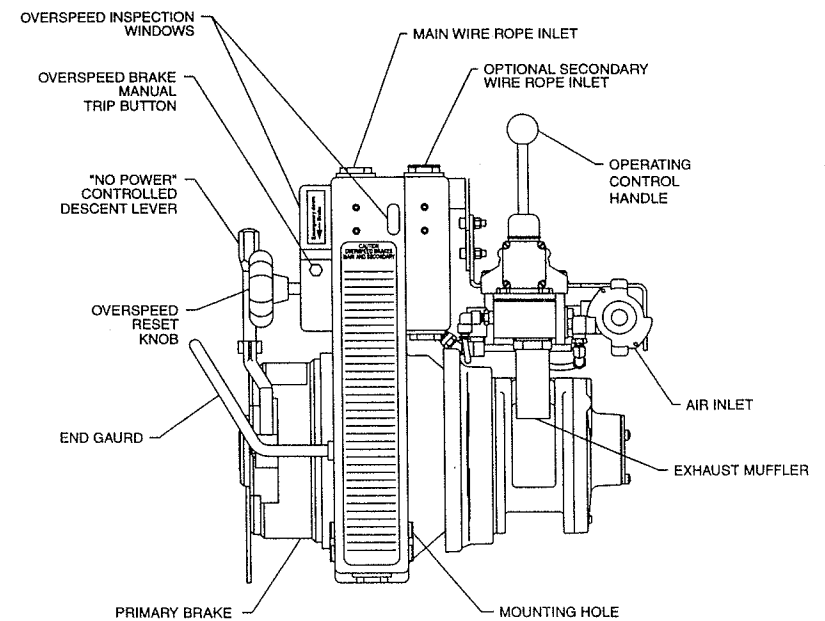
Wire Rope Size:	5/16", 6x19 IWRC, RRL (Ref. pg 16)
Air Pressure:	110 PSIG
Capacity:	1000 Lbs.
Speed:	UP TO 35 FT / MIN
Weight:	68 Lbs.
Air Consumption	75 SCFM

Recommended Air Line Filter and Lubricator for Single Hoist Operation Norgren 74 series Model 24-074-074

Recommended Air Hose Size 3/4" Typically

! WARNING: These units are intended for use with industrial compressed air systems only. They must not be used where pressure or temperature may exceed maximum operating conditions. Serious injury may result from doing so.

BE SURE TO READ THE COMPLETE OPERATING INSTRUCTION MANUAL AS WELL AS THIS SECTION BEFORE USING YOUR ZMAC / 1000AIR. Keep the manual with the hoist at all times.



Zmac / 1000 Air Powered Hoist MECHANICAL OPERATION

The mechanical operation of the air hoist is the same as the electric hoist. The transmission, traction sheave, safety devices and secondary brakes work exactly the same. (Overspeed for Secondary Wire Rope optional)

The differences between the air and electric hoist include the motor, control system and primary brake operation.

AIR LINE CONNECTION: The air line from the compressor is connected to the hoist at the Filter side of the Filter/Lubricator assembly. An air line connects the lubricator to the air inlet on the hoist. Secure the air line to stage or work cage so that it cannot fall away or put a strain on the connecting fittings if it should become accidentally disconnected.

FILTER/LUBRICATOR: The air is passed through the filter to remove liquid and solid particles from the compressed air. At the bottom of the filter bowl is a bleeder valve to allow collected liquids to be bled off. This should be done on a daily basis or more frequently if necessary to maintain a dry air supply. The filter bowl should be removed and the filter screen examined for dirt. Clean the screen in a cleaning solution with a brush when necessary.

The lubricator deposits a small amount of clean oil into the compressed air supply in order to lubricate the motor. Too much or too little oil could adversely affect the operation of the hoist. The oil level should be inspected frequently and the bowl filled with any 5 or 10 weight SAE, or Almo #525 motor oil when needed. The oil flow rate should be inspected whenever the bowl is filled. The recommended drip rate in the sight tube is 6 drops per minute with the hoist running. Turn the adjustment knob clockwise to decrease rate and counterclockwise to increase.



WARNING: Maximum inlet air pressure using a metal bowl is 110 PSIG. Maximum temperature is 175 degrees F.

CONTROL VALVE: The air from the lubricator is fed into the control valve. Engaging the handle in the up or down direction according to the instruction label will correspondingly operate the hoist. The handle is spring loaded so that it will automatically return to the off position when released.

AIR MOTOR: The air motor is a 4 hp vane type motor equipped with a muffler on the exhaust.

PRIMARY BRAKE/CONTROLLED DESCENT: The primary brake is a disc type brake that is automatically released by air pressure for normal up and down hoist operation. The brake is spring applied when the control valve is in the off position. For controlled descent operation of the hoist, the primary brake is manually held open.

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ADDITIONAL DAILY INSPECTION & MAINTENANCE REQUIREMENTS

Inspect the air compressor and hose line for leaks, kinks, blockages or other damage.

Inspect the hoses, fittings and valves on the hoist for leaks or damage.

Inspect the lubricator for oil.

Inspect the filter bleeder valve to drain water.

The hoist should be serviced by an authorized Zmac/1000 agent every 100 hours of use or annually.

ADDITIONAL TROUBLE SHOOTING

If the hoist will not operate, check the following:

1. Compressor is providing adequate supply of air at the proper pressure.
2. Blocked, leaking, or damaged air lines, hoses or fittings.
3. Clogged muffler. The muffler can become clogged with dirt, or ice created by water in the air supply that freezes when exhausted from the motor. Remove the muffler and clean.
4. Sluggish air motor. Flush the air motor with WD-40 in a well ventilated area. Disconnect the air line and add several teaspoons of WD-40 to the motor. Rotate the shaft by hand in both directions. Connect the airline and apply pressure slowly until all the WD-40 is exhausted from the motor.

If the vanes of the motor need to be replaced or the motor disassembled, only an experienced air motor mechanic should do the work. Contact your nearest Spider Service Department.

LONG TERM STORAGE

If the hoist is not going to be used for several weeks, it is recommended that the inlet and outlet hoses be removed from the air motor. Seal both the motor ports and air lines so no air or water can get in. Put the entire hoist into a large plastic bag and seal tightly.

Notes

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