

***LSR-1  
Limited Space Rescue Winch  
Operator's Manual***

- ***Operation***
- ***Service***
- ***Inspection***

**400542**

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## **CAUTION**

### ***Hazardous Working Environment***

***This equipment is used off the ground in high or dangerous places. Anyone using this equipment is exposed to a hazardous working environment.***

Users must be properly trained in the use and rigging of this equipment. Users must be familiar with and comply with all applicable local, state, and federal codes; safety rules and regulations pertaining to single and two-point suspension scaffolding; and general safety and health provisions. ***USERS OF THIS EQUIPMENT SHALL USE PERSONAL PROTECTIVE DEVICES AND LIFESAVING EQUIPMENT AT ALL TIMES IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS. Safety lines and harnesses shall be used in accordance with federal, state and local regulations. Specifications are subject to change. If in doubt, consult your supervisor or designated competent person.***

This equipment should not be used by persons affected by (but not limited to) the following: ill health, not of sound mind or body, under the influence of alcohol or drugs, acrophobia, epilepsy, fainting spells, suicidal tendency, dependency, or prone to accidents. Safety lines and harnesses shall be used in accordance with federal, state and local regulations

Neither the manufacturer nor its distributors can know of, anticipate, or warn against all dangers that exist or can ever arise. Be alert to recognize all dangers, known and unknown.

The equipment can be seriously weakened by many things, including (but not limited to): improper, inadequate, or incomplete assembly; fire; acid or other corrosive substances; contact with electrical circuits; corrosion; electrolysis; weather; careless handling; missing parts; improper usage or rigging; improper, inadequate, or incomplete maintenance, repair or replacements; damage in any way; exceeding the load limits.

Thoroughly inspect all parts and fasteners as often as possible. Inspect the equipment often for damage, corrosion, loose or missing parts, improper assembly, and wear.

Do not use this equipment if bent, broken, damaged, or weakened in any way.

If an inspection finds a condition you are doubtful of or do not understand, consult your employer or the manufacturer or his authorized repair and maintenance representative. Remove weakened or damaged equipment from service immediately. Do not repair or make modifications to equipment without manufacturer's written authorization. If the equipment requires repair or modification, notify your supervisor or designated competent person. Repairs and service can be provided by your local Spider representative.

The LSR-1 is designed for a rated working load of 1000 pounds. The total combined weight of workers, materials, and suspended stage shall not exceed the rated working load. **DO NOT OVERLOAD!** Do not apply impact loads to the LSR-1 or platform.

Improper use, treatment, or maintenance of this equipment can result in injury to or death of the user or others in the area.

***IMPORTANT — READ!***

Selected portions of the federal OSHA standards (Title 29 of the Code of Federal Regulation) have been reproduced in this manual for the convenience of Spider users. Spider assumes no responsibility for their accuracy, completeness or timeliness; or other conflicting codes enforced in the location of application. Obtain complete standards from the nearest office of the Department of Labor. Users should also review applicable state or local codes or regulations pertaining to general safety or use of this equipment.

***OSHA Requirements from Safety and Health Regulations for Construction***

***29 CFR Chapter XVII (7-1-97Edition)***

***Subpart C — General Safety and Health Provisions***

***§1926.20 General Safety and Health Provisions***

***(a) Contractor requirements***

- (1) Section 107 of the Act requires that it shall be a condition of each contract which is entered into under legislation subject to Reorganization Plan Number 14 of 1950 (64 Stat. 1267), as defined in §1926.12, and is for construction, alteration, and/or repair, including painting and decorating, that no contractor or subcontractor for any part of the contract work shall require any laborer or mechanic employed in the performance of the contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health or safety.

***(b) Accident-prevention responsibilities***

- (1) It shall be the responsibility of the employer to initiate and maintain such programs as may be necessary to comply with this part.
- (2) Such programs shall provide for frequent and regular inspections of the job sites, materials, and equipment to be made by competent persons designated by the employers.
- (3) The use of any machinery, tool, material, or equipment, which is not in compliance with any applicable requirement of this part, is prohibited. Such machine, tool, material, or equipment shall either be identified as unsafe by tagging or locking the controls to render them inoperable or shall be physically removed from its place of operation.
- (4) The employer shall permit only those employees qualified by training or experience to operate equipment and machinery.

***§1926.21 Safety Training and Education***

***(a) General requirements***

The Secretary shall, pursuant to Section 107(f) of the Act, establish and supervise programs for the education and training of employers and employees in the recognition, avoidance and prevention of unsafe conditions in employments covered by the act.

***(b) Employer responsibility***

- (1) The employer should avail himself of the safety and health training programs the Secretary provides.
- (2) The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury.
- (3) Employees required to handle or use poisons, caustics, and other harmful substances shall be instructed regarding the safe handling and use, and be made aware of the potential hazards, personal hygiene, and personal protective measures required.

### ***§1926.28 Personal protective equipment***

- (a) The employer is responsible for requiring the wearing of appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions or where this part indicates the need for using such equipment to reduce hazards to the employees.
- (b) Regulations governing the use, selection, and maintenance of personal protective and lifesaving equipment are described under Subpart E of this part.

### ***29 CFR Chapter XVII (7-1-97 Edition)***

#### ***Subpart E Personal Protective and Life Saving Equipment***

### ***§1926.104 Safety belts, lifelines, and lanyards***

- (a) Lifelines, safety belts, and lanyards shall be used only for employee safeguarding. Any lifeline, safety belt, or lanyard actually subjected to in-service loading, as distinguished from static load testing, shall be immediately removed from service and shall not be used again for employee safeguarding.
- (b) Lifelines shall be secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5,400 pounds.
- (c) Lifelines used on rock-scaling operations, or in areas where lifeline may be subjected to cutting or abrasion, shall be a minimum of 7/8-inch wire core manila rope. For all other lifeline applications, a minimum of 3/4-inch manila or equivalent, with a minimum breaking strength of 5,400 pounds, shall be used.
- (d) Safety belt lanyard shall be a minimum of 1/2-inch nylon, or equivalent, with a maximum length to provide for a fall of no greater than 6 feet. The rope shall have a nominal breaking strength of 5,400 pounds.
- (e) All safety belt and lanyard hardware shall be drop forged or pressed steel, cadmium plated in accordance with type 1, Class B plating specified in Federal Specification QQ-P-416. Surface shall be smooth and free of sharp edges.
- (f) All safety belt and lanyard hardware, except rivets, shall be capable of withstanding a tensile loading of 4,000 pounds without cracking, breaking, or taking a permanent deformation.

### ***29 CFR Chapter XVII (7-1-97 Edition)***

#### ***Subpart D – Walking-Working Surfaces***

### ***§1910.28 Safety requirements for scaffolding***

#### ***(a) General requirements for all scaffolds***

- (4) Scaffolds and their components shall be capable of supporting without failure at least four times the maximum intended load.
- (6) Any scaffold damaged or weakened from any cause shall be immediately repaired and shall not be used until repairs have been completed.
- (7) Scaffolds shall not be loaded in excess of the working load for which they are intended.
- (15) Materials being hoisted onto a scaffold shall have a tag line.
- (16) Overhead protection shall be provided for men on a scaffold exposed to overhead hazards.
- (17) Scaffolds shall be provided with a screen between the toeboard and the guardrail, extending along the entire opening, consisting of No. 18 gauge U.S. Standard Wire one-half-inch mesh or the equivalent, where persons are required to work or pass under the scaffolds.
- (18) Employees shall not work on scaffolds during storms or high winds.
- (19) Employees shall not work on scaffolds, which are covered with ice or snow, unless all ice or snow is removed, and planking sanded to prevent slipping.
- (20) Tools, materials, and debris shall not be allowed to accumulate in quantities to cause a hazard.

- (22) Wire or fiber rope used for scaffold suspension shall be capable of supporting at least six times the intended load.
- (27) Special precautions shall be taken to protect scaffold members, including any wire or fiber ropes, when using a heat-producing process.

***(g) Two-point suspension scaffolds (swinging scaffolds)***

- (4) The roof irons or hooks shall be of wrought iron, mild steel, or other equivalent material of proper size and design, securely installed and anchored. Tie-backs of three-fourth inch manila rope or the equivalent shall serve as a secondary means of anchorage, installed at right angles to the face of the building whenever possible and secured to a structurally sound portion of the building.
- (5) Guardrails not less than 2x4 inches or the equivalent and not less than 36 inches or more than 42 inches high, with a mid-rail, when required, of 1x4-inch lumber or equivalent, and toeboards, shall be installed at all open sides on all scaffolds more than 10 feet above the ground or floor. Toeboards shall be a minimum of 4 inches in height. Wire mesh shall be installed in accordance with paragraph (a)(17) of this section.
- (6) Two-point suspension scaffolds shall be suspended by wire or fiber ropes. Wire and fiber ropes shall conform to paragraph (a)(22) of this section.
- (8) All wire ropes, fiber ropes, slings, hangers, platforms, and other supporting parts shall be inspected before every installation. Periodic inspections shall be made while the scaffold is in use.
- (9) On suspension scaffolds designed for a working load of 500 pounds, no more than two men shall be permitted to work at one time. On suspension scaffolds with a working load of 750 pounds, no more than three men shall be permitted to work at one time. Each workman shall be protected by a safety lifebelt attached to a lifeline. The lifeline shall be securely attached to substantial members of the structure (not scaffold), or to securely rigged lines, which will safely suspend the workman in case of a fall.
- (10) Where acid solutions are used, fiber ropes are not permitted unless acid-proof.
- (11) Two-point suspension scaffolds shall be securely lashed to the building or structure to prevent them from swaying. Window cleaners' anchors shall not be used for this purpose.

***(i) Single-point adjustable suspension scaffolds.***

- (6) The hoisting machines, cables, and equipment shall be regularly serviced and inspected after each installation and every 30 days thereafter.
- (7) The units may be combined to form a two-point suspension scaffold. Such scaffold shall comply with paragraph (g) of this section.
- (8) The supporting cable shall be straight for its entire length, and the operator shall not sway the basket and fix the cable to any intermediate points to change his original path of travel.
- (9) Equipment shall be maintained and used in accordance with the manufacturers' instructions.
- (10) Suspension methods shall conform to applicable provisions of paragraphs (f) and (g) of this section.

**CODE OF SAFE PRACTICES  
FOR  
ADJUSTABLE SUSPENDED SCAFFOLDS  
CO-DEVELOPED BY THE SCAFFOLDING, SHORING & FORMING INSTITUTE (SSFI)  
and THE SCAFFOLD AND ACCESS INDUSTRY ASSOCIATION, INC. (SAIA)**

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 adjustable suspended scaffolds. These guidelines do not purport to be all-inclusive nor to supplant or replace other additional safety and precautionary measures. If these guidelines conflict with any local, provincial, state, federal or other government regulations, the regulations shall supersede these guidelines and it shall be the responsibility of each user to comply therewith.

**I. GENERAL GUIDELINES**

- A. POST THESE SAFE PRACTICES in a conspicuous place. Be sure that all persons who erect, use, relocate, or dismantle adjustable suspended scaffold systems are fully aware of them. Use them in tool box safety meetings.**
- B. FOLLOW ALL EQUIPMENT MANUFACTURER’S RECOMMENDATIONS as well as all local, provincial, state and federal codes, ordinances and regulations relating to adjustable suspended scaffold systems.**
- C. SURVEY THE JOB SITE. A competent person shall survey the job site for hazards such as exposed electrical wires, obstructions and, unguarded roof edges or openings.**
- 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 and remove it from the jobsite.**
- E. ERECT AND DISMANTLE ADJUSTABLE SUSPENDED SCAFFOLD EQUIPMENT in accordance with the design and/or manufacturer’s recommendations.**
- F. DO NOT ERECT, DISMANTLE OR ALTER ADJUSTABLE SUSPENDED SCAFFOLD SYSTEMS except under the supervision of a competent person.**
- G. DO NOT ABUSE OR MISUSE ADJUSTABLE SUSPENDED SCAFFOLD EQUIPMENT. Never overload any equipment.**
- H. ERECTED ADJUSTABLE SUSPENDED SCAFFOLDS ARE TO BE INSPECTED REGULARLY by the user to be sure that they are maintained in a safe condition. Stop work and report any unsafe condition to your supervisor.**
- I. NEVER TAKE CHANCES! IF IN DOUBT REGARDING THE SAFETY OR USE OF ADJUSTABLE SUSPENDED SCAFFOLDS, CONSULT A QUALIFIED PERSON.**
- J. NEVER USE ADJUSTABLE SUSPENDED SCAFFOLD EQUIPMENT FOR PURPOSES FOR WHICH IT WAS NOT INTENDED.**
- K. A COMPETENT PERSON SHALL CONSIDER STOPPING WORK WHEN WIND SPEED EXCEEDS 25 MPH FOR 2 POINT ADJUSTABLE SUSPENDED SCAFFOLDS OR 20 MPH FOR SINGLE POINT SUSPENSION. If materials on a platform create a sail effect, stopping work at lower wind speeds must be considered.**
- L. ADJUSTABLE SUSPENDED SCAFFOLD SYSTEMS are to be installed and used in accordance with the manufacturer’s recommended procedures.**
- M. ADJUSTABLE SUSPENDED PLATFORMS MUST NEVER BE OPERATED NEAR LIVE POWER LINES unless proper precautions are taken. Contact the power service provider for advice.**
- N. ALWAYS UTILIZE FALL ARREST EQUIPMENT when working on adjustable suspended scaffolds or when working near unguarded edges.**
- O. DO NOT WORK FROM, INSTALL OR MOVE ADJUSTABLE SUSPENDED SCAFFOLDS if you are sick or impaired in any way.**
- P. DO NOT WORK ON ADJUSTABLE SUSPENDED SCAFFOLDS when under the influence of alcohol or drugs.**
- Q. DEBRIS SHOULD NOT BE STORED OR ALLOWED TO ACCUMULATE ON A PLATFORM.**
- R. INDEPENDENT ADJUSTABLE SUSPENDED SCAFFOLDS ARE TO BE POSITIONED SO AS TO AVOID OVERLAPPING OR POSSIBLE INTERFERENCE FROM ANOTHER SCAFFOLD.**

## **II. GUIDELINES FOR ERECTION AND USE OF ADJUSTABLE SUSPENDED SCAFFOLD SYSTEMS**

### **A. RIGGING:**

- 1. UTILIZE FALL PROTECTION EQUIPMENT** when rigging near unguarded edges.
- 2. SUPPORTING DEVICES** must be capable of supporting the hoist rated load with a safety factor of 4.
- 3. ALL OVERHEAD RIGGING** must be secured from unwanted movement in any direction.
- 4. COUNTERWEIGHTS USED WITH OUTRIGGER BEAMS** must be of a non-flowable material and must be secured to the beam to prevent accidental displacement.
- 5. OUTRIGGER BEAMS THAT DO NOT USE COUNTERWEIGHTS** must be installed and secured to the roof structure with bolts or other direct connections. Direct connections shall be evaluated by a competent person.
- 6. TIE BACK ALL TRANSPORTABLE RIGGING DEVICES.** Tieback shall be equivalent in strength to the suspension ropes.
- 7. INSTALL TIEBACKS AT RIGHT ANGLES TO THE FACE OF THE BUILDING** and secure them without slack, to a suitable anchor capable of supporting the hoist rated load with a safety factor of 4.
- 8. IN THE EVENT THAT 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** to prevent movement or side loading.

### **B. WIRE ROPE AND HARDWARE:**

- 1. USE ONLY WIRE ROPE AND ATTACHMENTS** specified by the hoisting machine manufacturer.
- 2. HANDLE WIRE ROPE WITH CARE.** Always use gloves.
- 3. COIL AND UNCOIL WIRE ROPE** in accordance with manufacturer's instructions in order to avoid kinking or damage.
- 4. ASSURE THAT THE WIRE ROPE IS LONG ENOUGH** to reach to the lowest possible landing.
- 5. CLEAN AND LUBRICATE WIRE ROPE** in accordance with the wire rope manufacturer's instructions.
- 6. INSPECT WIRE ROPE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.** 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.
- 7. WIRE ROPES USED WITH TRACTION HOISTS MUST HAVE PREPARED ENDS.** Follow hoist manufacturer's recommendations.
- 8. USE THIMBLES AT ALL WIRE ROPE SUSPENSION TERMINATIONS.**
- 9. USE J-BOLT WIRE ROPE CLAMPS OR SWEDGE FITTINGS. DO NOT USE U-BOLT CLAMPS.**
- 10. TIGHTEN THE J-BOLT WIRE ROPE CLAMPS** in accordance with the manufacturer's instructions.

### **C. POWER SUPPLY FOR MOTORIZED EQUIPMENT:**

- 1. USE PROPERLY GROUNDED ELECTRICAL POWER CORDS.** Protect them with circuit breakers.
- 2. USE POWER CORDS AND AIR HOSES OF THE PROPER SIZE THAT ARE LONG ENOUGH** for the application.
- 3. POWER CORD and AIR HOSE CONNECTIONS MUST BE RESTRAINED** to prevent separation.
- 4. USE STRAIN RELIEF DEVICES TO ATTACH POWER CORDS AND AIR SUPPLY HOSES TO THE PLATFORM,** to prevent them from separation.
- 5. PROTECT POWER CORDS AND AIR HOSES FROM SHARP EDGES.**
- 6. USE GFCI WITH POWER TOOLS.**



**D. FALL ARREST EQUIPMENT:**

- 1. EACH PERSON ON AN ADJUSTABLE SUSPENDED SCAFFOLD must be attached to an independent fall arrest system.**
- 2. EACH VERTICAL LIFELINE SHALL BE ATTACHED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS to a separate anchorage capable of supporting a minimum of 5000 pounds (2267 kg) or an anchorage designed by a qualified person.**
- 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 AND EDGES to prevent chafing.**
- 5. RIG FALL ARREST SYSTEMS to minimize free fall.**
- 6. INSTALL VERTICAL LIFELINES SO THEY HANG FREELY.**
- 7. USE LIFELINES that are compatible with the rope grab.**
- 8. INSTALL ROPE GRAB IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. Rope grab must be properly oriented.**
- 9. KEEP ROPE GRAB POSITIONED ABOVE YOUR HEAD.**
- 10. UTILIZE FULL BODY HARNESES of the proper size and fit.**
- 11. UTILIZE SHOCK ABSORBING LANYARD attached to the D-ring at the center of your back between the shoulder blades.**
- 12. INSPECT FALL PROTECTION ANCHORAGE / EQUIPMENT BEFORE EACH USE. Consult the fall protection supplier for inspection procedures.**
- 13. WHEN A SECONDARY WIRE ROPE SYSTEM IS USED instead of a vertical lifeline, attach the lanyard to a horizontal lifeline or an approved platform anchor.**

**E. DURING USE:**

- 1. USE ALL EQUIPMENT AND ALL DEVICES in accordance with the manufacturer's instructions.**
- 2. DO NOT OVERLOAD OR MODIFY EQUIPMENT.**
- 3. INSPECT ALL EQUIPMENT INCLUDING HOISTS, PLATFORM, AND RIGGING before each use.**
- 4. INSPECT WIRE ROPE BEFORE AND DURING USE.**
- 5. USE CARE TO PREVENT DAMAGE TO EQUIPMENT.**
- 6. CLEAN AND SERVICE EQUIPMENT REGULARLY. Follow manufacturers' recommendations.**
- 7. ALWAYS MAINTAIN AT LEAST (4) FOUR WRAPS OF WIRE ROPE ON DRUM TYPE HOISTS.**
- 8. DO NOT CONNECT PLATFORMS unless the installation was designed for that purpose.**
- 9. DO NOT MOVE ADJUSTABLE SUSPENDED SCAFFOLDS HORIZONTALLY unless safe work practices are followed.**
- 10. WHEN RIGGING FOR ANOTHER DROP assure sufficient wire rope is available before moving the suspended platform horizontally to the next location.**

**F. WELDING FROM SUSPENDED SCAFFOLDS REQUIRES SPECIAL TRAINING:**

- 1. ASSURE PLATFORM IS GROUNDED TO THE STRUCTURE using a grounding conductor.**
- 2. INSULATE WIRE ROPE ABOVE AND BELOW THE PLATFORM.**
- 3. INSULATE WIRE ROPE AT SUSPENSION POINT AND ASSURE WIRE ROPE DOES NOT CONTACT THE STRUCTURE ALONG ITS ENTIRE LENGTH.**
- 4. PREVENT THE WIRE ROPE END FROM BECOMING GROUNDED.**
- 5. INSULATE EACH HOIST WITH A PROTECTIVE COVER.**
- 6. INSULATE TIE BACK WIRE ROPES AT THE CONNECTION POINTS.**

Since field conditions vary and are beyond the control of the SSFI and the SAIA, safe and proper use of adjustable suspended scaffolding is the sole responsibility of the user.

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***Additional requirements when welding from suspended stages:***

- Use an insulated thimble to attach each wire rope to its rigging. (See Wire Rope Insulator.)
- Cover the suspension wire rope with insulating material 4 ft. above and below the wire rope guide. (See Arc Guard Kit in the ***Accessory Equipment*** section of this manual.) In addition, if using a traction hoist, do not allow the tail of the wire rope to contact the structure below the platform.
- Ground the staging to the structure. The conductor shall be at least the size of the welding process work lead. This is in addition to the primary welding machine grounding lead. Turn off the welding machine before disconnecting the stage grounding lead.
- Arcing will occur upon contact of the welding electrode with the staging and its components, including the suspension wire ropes. Care should be taken to prevent contact.
- Cover the hoist with a protective and insulated cover.
- Refer to 29 CFR Part 1926.451(f)(17) for the current laws and to ANSI 10.8 paragraph 6.2.9 for current safety standards to follow when using suspended stages for welding.
- See the ***Accessory Equipment*** section of this manual for more information.

# OPERATING INSTRUCTIONS FOR THE LSR-1

## GENERAL DESCRIPTION OF THE LSR-1

The LSR-1 is a component in the confined space rescue plan for your facility. However, a good rescue plan will include not only the LSR-1 but also a compatible fall arrest system, personnel training and the planning necessary to rescue and retrieve injured personnel from confined spaces quickly and safely.

The LSR-1 is an air powered, man rated drum winch for use with suspended staging as a rigging point in confined spaces. It permits the suspended staging to be quickly and safely lowered from outside the confined space in emergency situations. The LSR-1 can be used either as a freestanding, overhead unit with its extension, or can be used without the extension when it is fastened to an adequate structure. When the LSR-1 is used with the extension assembly and with loads greater than 300lbs, it can safely move in the down direction only because of the level-wind drum tilt feature.

The winch motor is reversible and is operated by a hand lever. A tension holder is used to keep tension on the rope on the drum to prevent bird-nesting and rope damage. The winch can be broken down into three pieces without tools to fit the individual pieces through as small as an 18" x 24" oval manway or for storage. The basic features of the LSR-1 are shown in Figure One.

The specifications of the LSR-1 are as follows:

- Overall Weight w/o wire rope 200lbs
- Heaviest single piece w/o wire rope 150lbs
- Overall dimensions 39"W X 21"H X 42"L
- Motor 1.25hp Vane Motor
- Air Requirements 60cfm @ 120psi
- Speed Range 0-30fpm
- Drum Capacity 500ft
- Rated Load Capacity 1000lb

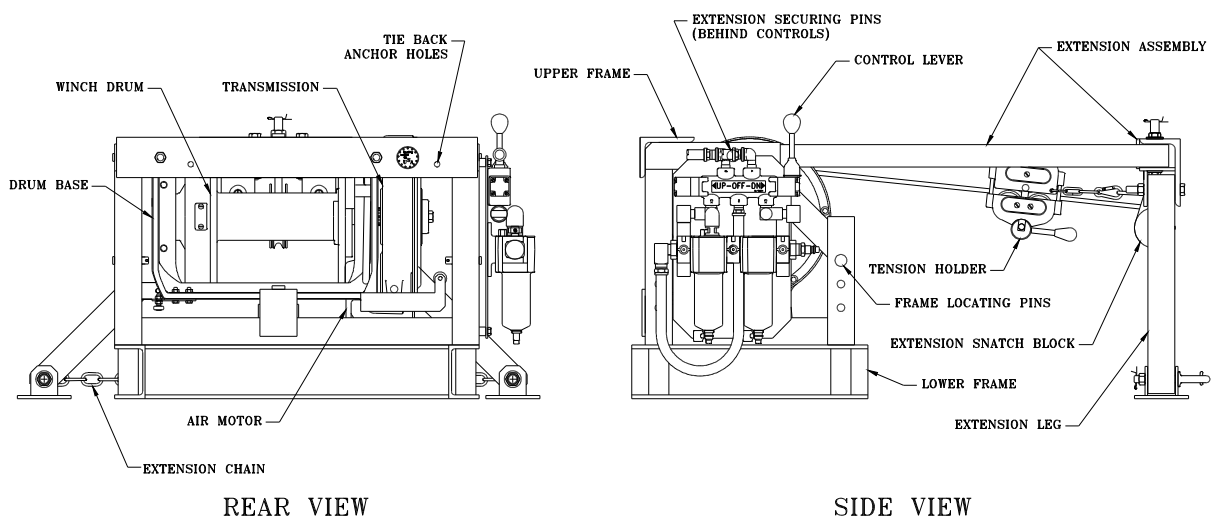


FIGURE ONE: LSR-1 GENERAL DESCRIPTION

## ***USE OF THE LSR-1 WITH THE EXTENSION***

The extension assembly can be used with the LSR-1 in overhead rigging applications such as in the penthouse of a boiler, top of a silo or top of a tank where there are access ports or roof penetrations through the top and into the confined space below. The penetration opening must be large enough to pass the end of the wire rope through and the penetration must be directly over the space where the suspended stage is to be hung. The structure surrounding the penetration must be capable of supporting 4 times the loads applied to it by the LSR-1.

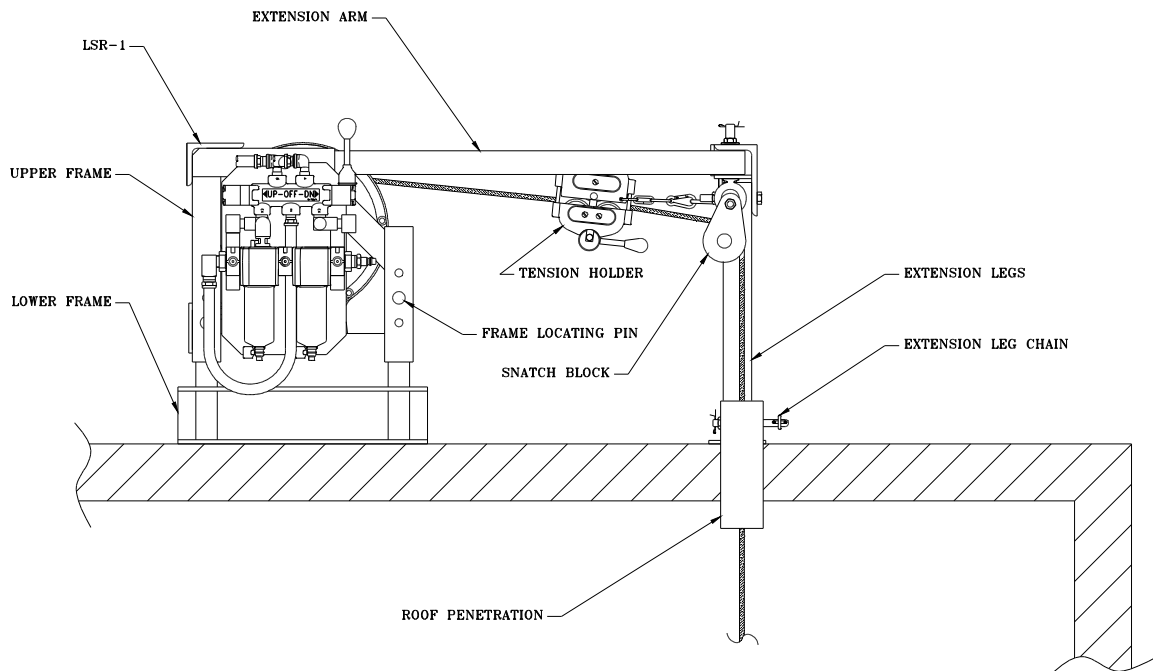


FIGURE TWO: USE OF THE LSR-1 WITH THE EXTENSION ASSEMBLY

## ***SETTING UP THE LSR-1 WITH THE EXTENSION***

Locate the LSR-1 with the extension attached so the snatch block is directly over the roof penetration (see Figure Two). Place the lower frame and extension feet on plywood or sheet metal to spread the load if necessary. The majority of the downward load will be exerted at the extension assembly feet.

Adjust the frame height so the snatch block has adequate clearance over the penetration projection. Remove the four (4) frame locating pins holding the upper and lower frames together, and raise or lower the upper frame to the desired height, and then replace the locating pins and hairpins. Disconnect the extension leg chain shackle and adjust the chain length so that the extension arms are level and the chain is tight. Use the tieback anchor holes in the upper frame, if tiebacks are required.

While pulling on the wire rope to maintain tension and prevent the wire rope from bird-nesting on the drum, release the tension holder. While still pulling on the rope, operate the hoist in the down direction to unwind the rope and guide the rope through the roof penetration and into the confined space. Use leather gloves or heavy shop rags to prevent hand injuries from the wire rope. It is recommended that two people perform this operation.

***Do not allow the rope to go slack during this step or the rope on the drum will birds-nest. ALWAYS KEEP AT LEAST FOUR WRAPS OF ROPE ON THE DRUM!***

Run out as much wire rope as needed to reach the bottom of the confined space. Release the hand lever while still maintaining tension on the rope until the tension holder has been engaged. If necessary, jog the control lever in the up

direction to increase the rope tension after engaging the tension holder. Inspect the LSR-1 wire rope drum to make sure the remainder of the wire rope is stored neatly.

***CAUTION:*** *Keep hands, clothing and other parts of the body away from the wire rope where it enters the extension snatch block and the penetration. Pinching body parts between moving wire rope and other parts could cause injury to the operator.*

Connect the stage suspension rope to the end of the LSR-1 rope. Connection hardware must be capable of supporting 6 times the rated capacity of the LSR-1. The suspended stage hoist must not have a higher rated load capacity than the LSR-1 (1000lb). Mark the LSR-1 rope with paint or tape above the rope connection to indicate to the operator when to stop the LSR-1 to prevent pulling the rope connection through the roof penetration.

When welding from the suspended stage an insulated thimble or Insulator Assembly (Spider P/N 4897 or 701075-1) must be installed between the LSR-1 rope and the suspended stage rope to insulate the suspended stage rope (see Figure Three). The suspended stage rope must also be covered with insulating material 4ft above the stage hoist. See the description of the Arc Guard Kit and Insulator Assembly in the Accessory Equipment section of this manual.

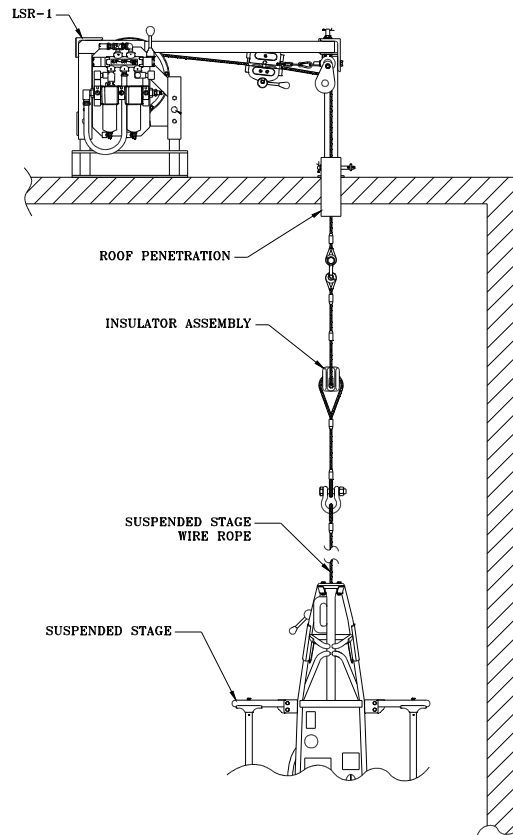


FIGURE THREE: TYPICAL RIGGING ARRANGEMENT

With the tension holder still engaged, operate the LSR-1 in the up direction while providing enough slack in the suspended stage rope to keep from lifting the stage. Be sure the LSR-1 rope winds evenly onto the drum, and that the wraps are tightly pressed together. If loose wraps or crossovers occur, operate the winch in the down direction while pulling on the rope until the bad wraps have been removed, then rewind the rope correctly. Use a wooden pry bar inserted into the pry bar socket in the upper frame to press the wraps together and force the rope against the drum flanges if necessary. Do not allow the wire rope to rub against the edges of the roof penetration or other surfaces while rewinding the rope. Release the control hand lever when the stop indicator on the rope appears.

***Do not use the LSR-1 to lift loads exceeding 300lb with the extension attached. The drum tilt feature will cause excessive rubbing between the rope and the wraps on the drum and will damage the rope.***

***CAUTION: Keep hands, clothing and other parts of the body away from the wire rope where it enters the extension snatch block and the penetration. Pinching body parts between moving wire rope and other parts could cause injury to the operator.***

### ***USE OF THE LSR-1 WITHOUT THE EXTENSION***

The LSR-1 without the extension must be fastened to an adequate structure capable of supporting 4 times the rated load capacity of the LSR-1. When used in this way the rope can be rigged through manways, inspection doors and access ports over snatch blocks or sheaves. The first rigging point must be a distance of 12 feet from the LSR-1 perpendicular to the centerline of the drum for the winch to level wind properly. The LSR-1 rope must not be sloped more than 45° from the lower frame. All rigging attachment points and accessories must be capable of supporting 4 times the load applied to them.

### ***SETTING UP THE LSR-1 WITHOUT THE EXTENSION***

Manually hold tension on the wire rope, release the tension holder and unwind about 2-3' of rope off the drum. Unhook the tension holder assembly from the extension assembly, then rewind the rope and hook the tension holder onto the hole in the pry bar socket on the upper frame to maintain tension on the wire rope.

Unreeve the rope from the extension assembly snatch block. Remove the ½" clevis pins that secure the extension assembly to the frame and remove the extension assembly. The snatch block can be removed from the extension assembly for use in the rigging if needed. Reinstall the clevis pins in the drum tilt lock out holes in the upper frame to prevent the drum from tilting under load (see Figure Four).

Fasten the LSR-1 to the structure. Use either a combination of the tieback holes in the rear of the upper frame and at least 2 of the mounting holes in the lower frame, or all 4 of the mounting holes in the lower frame (see Figure Four). The structure must be capable of holding 4 times the rated load of the LSR-1.

Locate the first rigging point at least twelve feet from the LSR-1 perpendicular to the drum center. Assemble and install the remaining sheaves and blocks necessary to complete the rigging system. All rigging supports must be capable of supporting 4 times the intended applied load.

Unwind enough rope to unhook the tension holder from the pry bar socket. Hold the rope taut and unwind enough rope to reach the first sheave or block in the rigging. It is recommended that two people perform this operation. Hook the tension holder onto the block or sheave support at a location where the tension holder will not interfere with the passage of the rope, and then reeve the rope through the first sheave. The remaining sheaves and blocks can be reeved by releasing the tension holder while pulling on the rope, unwinding enough rope to reach the next rigging point, and then resetting the tension holder.

***Do not allow the rope to go slack during this step or the rope on the drum will birds-nest. ALWAYS KEEP AT LEAST FOUR WRAPS OF ROPE ON THE DRUM!***

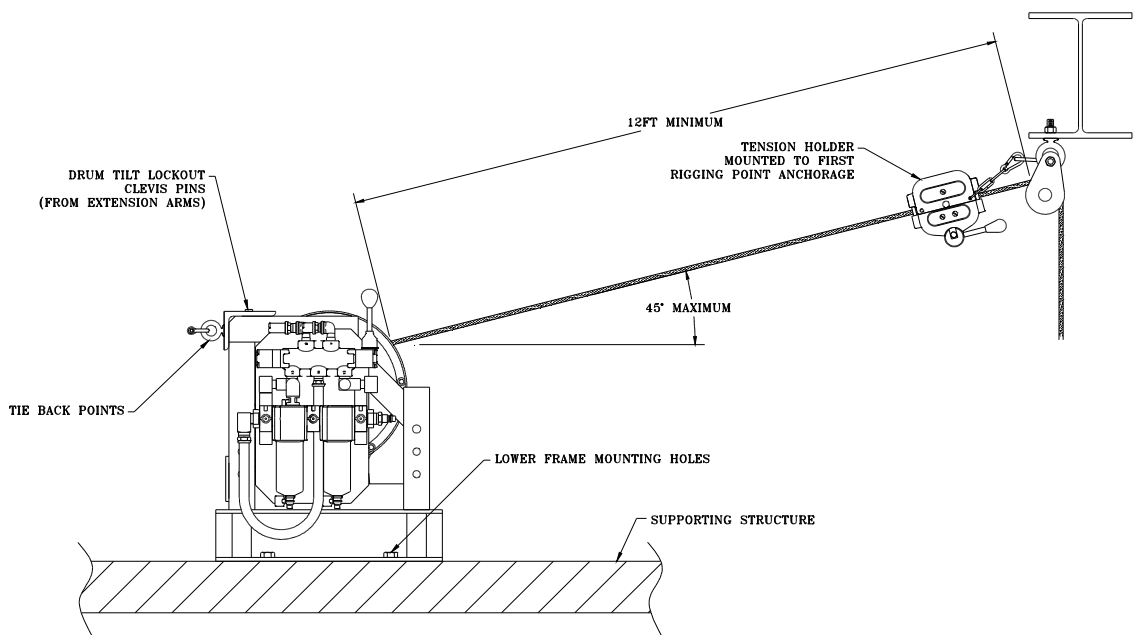


FIGURE FOUR: USE WITHOUT EXTENSION

***CAUTION:*** *Keep hands, clothing and other parts of the body away from the wire rope where it enters the snatch block and sheaves. Pinching body parts between moving wire rope and other parts could cause injury to the operator.*

When enough wire rope has been removed from the drum to reach the suspended stage hoist, connect the stage suspension rope to the end of the LSR-1 rope. Connection hardware must be capable of supporting 6 times the rated load capacity of the LSR-1 (1000lb). Inspect the LSR-1 wire rope drum to make sure the remainder of the wire rope is stored neatly.

When welding from the suspended stage an insulated thimble or Insulator Assembly (Spider P/N 4897 or 701075-1) must be installed between the LSR-1 rope and the suspended stage rope to insulate the suspended stage rope (see Figure Three). The suspended stage rope must also be covered with insulating material 4ft above the stage hoist (see Arc Guard Kit in the Accessory Equipment section of this manual).

With the tension holder still engaged, operate the LSR-1 in the up direction while providing enough slack in the suspended stage rope to keep from lifting the stage. Be sure the rope winds evenly onto the drum, and that the wraps are tightly pressed together. If loose wraps or crossovers occur, operate the winch in the down direction while pulling on the rope until the bad wraps have been removed, then rewind the rope correctly. Use a wooden pry bar inserted into the pry bar socket in the upper frame to press the wraps together and force the rope against the drum flanges if necessary. Do not allow the wire rope to rub against other surfaces while rewinding the rope. Release the control hand lever before the rope connection reaches the rigging. Be sure not to pull the connection hardware between the LSR-1 and suspended stage rope through the rigging.

***CAUTION:*** *Keep hands, clothing and other parts of the body away from the wire rope where it enters the snatch block and sheaves. Pinching body parts between moving wire rope and other parts could cause injury to the operator.*

## ***LOWERING A DISABLED STAGE***

***IF THE PERSONNEL ON THE SUSPENDED STAGE ARE INJURED OR UNCONSCIOUS CALL 911 OR THE LOCAL EMERGENCY RESPONSE ORGANIZATION IMMEDIATELY.***

If the personnel on the suspended stage are conscious, inform them of your intention to lower them. If the personnel on the suspended stage are unconscious, try to determine if they are free to be lowered. and that there are no obstructions or protrusions that will snag on their safety line, clothing or extremities that could pull them from the suspended stage as the suspended stage is lowered.

Release the tension holder and operate the LSR-1 in the down direction. At the same time, the fall arrest system must permit the personnel onboard to be lowered without pulling them from the suspended stage and provide the personnel with fall protection in case they fall from the stage while it is being lowered. If at all possible, keep in verbal contact either with the personnel onboard the stage or with other personnel who can see the personnel onboard. Lower the suspended stage until rescue personnel can reach it. Reapply the tension holder to make sure the wire rope stays taut and does not birds-nest on the drum.



## ***USE OF LSR-1 AS A LIFELINE ANCHORAGE***

A second LSR-1 unit can be used as a proper anchorage for a vertical lifeline or self retracting lifeline system. Proper use would allow for the controlled descent of an unconscious or incapacitated worker that has fallen or has left the confines of the stage he/she was operating from.

***CAUTION:*** *When a second LSR-1 unit is used as a fall arrest anchorage ...Vertical or self retracting lifeline systems CAN NOT be attached to the same LSR-1 as the suspension rope for the platform or stage.*

## ***INSTALLATION OF THE VERTICAL LIFELINE SYSTEM***

1. Secure the LSR-1 system to approved location above the roof penetration or other access point to the confined space. Decking or floor must be capable of supporting 5,000 lbs per hoist installed.
2. If using the extension assembly, consult instructions on setup found on **page 11** of this manual. If not using the extension assembly, consult instruction for setup found on **page 13** of this manual.
3. Unwind enough wire rope to reach the bottom of the confined space. Once the wire rope has reached the bottom of the confined space engage the tensioning device to maintain proper tension on the drum. If necessary, jog the control lever in the up direction to increase the rope tension after engaging the tension holder
4. Connect the vertical lifeline or self retracting lifeline to the end of the LSR-1 rope. Proper connection hardware is required and must be capable of supporting 5,000 lbs. See Figure Five.
5. When welding from the suspended stage an insulated thimble or Insulator Assembly (Spider P/N 4897 or 701075-1) must be installed between the LSR-1 rope and the vertical lifelines or self retracting lifelines that use wire rope. The wire rope must also be covered with insulating material 4ft above the connection to the users harness. See the description of the Arc Guard Kit and Insulator Assembly in the Accessory Equipment section of this manual.
6. After lowering the wire rope mark the LSR-1 rope with paint or tape 4-5 feet (depending on setup, determined by competent person) above any rope connection to indicate to the operator when to stop the LSR-1 to prevent pulling the rope connection through the roof penetration or other access point.
7. Operate the hoist in the upward direction raising the vertical lifeline upwards. Once the vertical lifeline has reached the top, ensure the tensioning device is engaged and there is proper tension on the drum. If using a self retracting lifeline secure the harness end of the system while the block is moving upwards allowing the rope to pay out.

***CAUTION:*** *Install and use fall arrest equipment and devices only in accordance with the manufacturer's instruction!*

## ***OPERATING THE LSR-1 TO LOWER A PERSONAL FALL ARREST SYSTEM***

Development of a confined space rescue plan for every site is required to prevent unnecessarily exposing personnel to hazards that can lead to further injury. All personnel accessing the confined space or aiding in the rescue efforts must be trained to follow the steps required by that plan.

If you know the personnel on the suspended stage are injured or unconscious, call 911 or the local emergency response organization immediately.

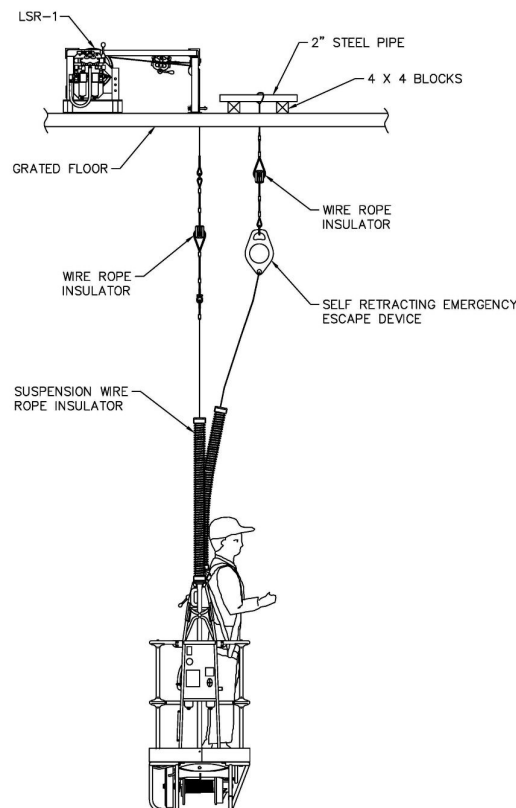
***NOTE:*** *In some cases calling 911 in the event of an emergency is not the fastest or most effective method of rescue. Always review the safety plan for your specific worksite.*

If a worker needs to be lowered the operator is required to be able to physically see the affected worker/suspended platform, or be in communication with someone who can. Before operating the hoist in the downward direction ensure there are no obstructions that may impede the travel of the worker and that there are no suspensions lines, tag lines etc. that may tangle and bring further harm.

If the personnel on the suspended stage are conscious, inform them of your intention to lower them. Maintain contact during the lowering process to ensure they are able to disengage their rope grab and are not being exposed to more hazards.

If you cannot communicate with the personnel on the suspended stage or they are unconscious, lower the stage and the personal fall arrest system simultaneously to ensure the personnel are not pulled from the stage by the personal fall arrest system or that any slack is created in the vertical safety line, if used.

Use the same steps as described on **page 15** of this manual to lower both the stage and the personal fall arrest system.



**FIGURE FIVE: LSR-1 USE AS A LIFELINE ANCHORAGE**

***CAUTION:*** *Always follow manufacturer's directions for proper use of equipment. If any questions arise as to proper use or safety of any equipment discontinue use and contact manufacturer immediately.*

## ***DISMANTLING THE LSR-1***

With the suspended stage setting on an adequate support and suspended stage rope slack; release the tension holder while pulling on the LSR-1 rope. Operate the LSR-1 in the down direction until the rope connection can be reached. Engage the tension holder, then disconnect the LSR-1 rope and remove any connection hardware. With the tension holder engaged operate the winch in the up direction to wind the rope onto the drum. Make sure the rope winds evenly onto the drum and that each wrap is tightly pressed against each other. Use a wooden pry bar inserted into the pry bar socket to press the wraps together and force the rope against the drum flange if necessary.

Wind the rope onto the drum until the end is at the tension holder. If the extension assembly is attached the LSR-1 is ready to be moved. Be sure the rope is held taut between the tension holder and the drum.

If the LSR-1 extension assembly is not attached, when the end of the rope gets to the last sheave or block unhook the tension holder from the block or whatever it was hooked on to. Do not remove the tension holder from the rope. Wind the remaining length of rope onto the drum while maintaining the tension. Hook the tension holder onto the hole in the pry bar socket in the upper frame. If necessary, the extension assembly can be re-installed by reversing the steps outlined in ***SETTING UP THE LSR-1 WITHOUT THE EXTENSION*** section of this manual.

## ***DISASSEMBLY OF THE LSR-1 FOR PASSAGE THROUGH OPENINGS***

The LSR-1 can be broken down for storage or for fitting it through manways and other access ports. While holding the rope taut, disconnect the tension holder from the extension assembly. Wind the rope onto the drum, then hook the tension holder onto the hole in the pry bar socket. The lower frame and extension assembly can now be removed from the upper frame and winch assembly by removing the necessary clevis pins.

*NOTES*

## **WIRE ROPE INSPECTION AND SERVICE**

### **OSHA 1910.28 Safety requirement for scaffolding**

#### **(a) General Requirements for scaffolding**

(22) Wire or fiber rope used for scaffold suspension shall be capable of supporting at least six times the intended load.

### **OSHA 1926.451 General requirements**

#### **(a) Capacity**

(4) Each suspension rope, including connecting hardware, used on adjustable suspension scaffolds shall be capable of supporting, without failure, at least 6 times the maximum intended load applied or transmitted to that rope with the scaffold operating at either the rated load of the hoist, or 2 (minimum) times the stall load of the hoist, whichever is greater.

Inspecting the suspension wire rope is very important. Wire rope is a consumable item—each time it is used, it loses strength. The rate at which a wire rope weakens depends on where and how often it is used, how badly it is misused, and the condition of the equipment it is used with.

The inspection is to determine, to the best extent possible, whether the wire rope has enough integrity to support a scaffold with the desired safety factor until the next inspection.

The wire rope recommended for the Spider equipment in this manual is 6 x 19, fiber core, right regular lay, Seale construction, improved plow steel with a rated minimum breaking strength of 4.26 tons. Never use a wire rope beyond the point where it cannot support 3.75 tons.

#### **Daily inspection**

Equipment operators should monitor the wire rope condition daily. Even very subtle changes in the wire rope's appearance could mean it is worn out and should be replaced. The daily inspection should include a visual examination for rust or corrosion, lack of lubrication, broken wires, kinks, crushed spots, or abrasive wear of individual wires.

#### **WARNING**

***Do not use the equipment if you are not certain of its condition.  
If the daily inspection shows signs of wear or damage to the wire rope, DO NOT USE IT!***

#### **30-day inspection**

The wire rope should be examined by a person who is known by you or the employer to be trained, knowledgeable and able to determine whether the wire rope still is safe to use. A written record should be kept with the equipment or other convenient location indicating when a new wire rope is first installed. See the **Wire Rope Inspection Report** at the end of this manual.

A wire rope can be used up for several reasons or combination of reasons, including abrasion, corrosion, scrubbing, flattening, peening, kinking, exposure to excessive heat, and broken wires. Each of these conditions is described below.

- Abrasion is the wearing away of the wire because of contact with other wires, equipment or structures. Abrasion removes metal from the cross-section of each outer wire at exposed surfaces. Abrasion can be along a considerable length of the wire rope or show up in one short distance. The net result could be failure of the wire rope. The 6x19 Seale-construction wire rope recommended by Spider is chosen for abrasion resistance. The outer wires are larger, which provides a greater metallic area. This construction has 69% of its strength in the outer or exposed wires of the strands.
- Corrosion can occur because of inadequate lubrication and a corrosive environment (humidity, rain, salt spray, or caustic fumes or chemicals). The first sign of corrosion is the appearance of rust. Corroded wire rope does not

have its original strength, and isn't able to resist bending fatigue or withstand abrasion. Fine particles of corroded wire work into the internal structure of the wire and add to the abrasion.

- Scrubbing is similar to abrasion. The wire rope might be in contact with the structure. When in use, the wire rope can move back and forth against the structure and become worn. It is very important to make sure the wire rope is not touching any structure between the staging and the rigging.
- Flattening and peening can be caused by kinking, improper drum spooling, or contact with other structural members.
- The wire can be crushed on the drum from improper spooling and crossed layers. The pressure can change the shape and physical properties of the rope, or its cross-section can be distorted, changing the position of strands and core.
- Sand blasting can quickly damage or sever the wire rope.
- Corrosion, scrubbing, flattening, peening, or crushing can reduce the cross section of both the inner and outer wires.

### ***When to replace the wire rope***

Replace the wire rope when it shows any of the following:

- Any combinations of detrimental effects that will weaken the wire rope so that it cannot safely support at least 6 times the hoist capacity.
- Abrasion, corrosion, scrubbing, flattening, or peening causing loss of more than 1/3 of the diameter of the outside individual wires.
- Evidence of any heat damage from a torch or contact with electrical wires.
- Reduction of 0.0156 inch of the rope's original diameter.
- More than one valley break (broken wire). This could mean that non-visible wires are fatigued or broken.
- Six randomly distributed broken wires in one rope lay or three broken wires in one strand within one rope lay.

### ***Servicing the wire rope***

- Lubricate the wire rope often to prevent rust. Use a penetrating corrosive-resistant lubricant to ensure that the core remains lubricated.
- Keep the wire rope correctly wound on the drum, and do not allow it to become slack. Use the tension holder to keep the wire rope taut and properly wound on the drum when changing rigging locations or storing the unit.
- Do not kink or bend the wire rope over a sharp edge.
- Keep clear of all power lines, including arc-welding leads. The equipment is independently grounded, so the wire rope will conduct electricity even when rigging is insulated.
- Rig properly to avoid damage to the wire rope.
- Do not use cable clips on the suspension wire rope. They will not pass through the extension assembly snatch block and can be pushed up the rope by the roof penetration, damaging and weakening the wire rope. If wedge sockets are used, the socket cannot be removed to extend or lengthen the rope. Whenever a wedge socket has been removed, the rope where the wedge socket was applied must be cut off and discarded. This is due to the fact the rope at the point of attachment is damaged by the socket. This is true for Fist Grips, Wedge Sockets, etc.

### ***Removing the old wire rope***

1. Remove the tension holder cam and half of the tension holder.
2. Run the power unit in the down direction while pulling the wire rope through the extension, until all of the wire rope is off the drum.
3. Unreeve the rope from the extension assembly snatch block.
4. Once the drum hook at the end of the rope is free and pulled away from the drum flange, rotate the flange slot to the 6 o'clock position. Then thread the drum hook through the hole in the drum flange. Keep hands and clothing away from the moving drum at all times.

### ***Installing a new wire rope***

1. Rotate the flange slot to the 6 o'clock position. Thread the drum hook through the hole in the drum flange. Seat the drum hook in the socket next to the drum shaft. Keep hands and clothing away from the moving drum at all times.
2. With the drum hook properly installed, reeve the rope through the extension snatch block and install the tension holder, tension holder cam, screw and wing nut.
3. Wind the wire rope onto the drum by running the power unit UP. Be sure the first wrap of wire rope lies against the drum flange and that every wrap after that lies tightly against the previous wrap. It is important that the wire rope be tightly and evenly wound on the drum.
4. A simple way to hold extra tension on the rope while winding onto the drum is to use a wire rope installation tensioning clamp. Use a wooden pry bar inserted into the pry bar socket in the upper frame to press the wraps together and force the rope against the drum flanges if necessary.

### ***Use of the wire rope tensioning clamp (SA-3619 for 5/16-inch rope)***

1. With the wire rope drum hook and tension holder installed, clamp the tensioning blocks on the wire rope in front of the extension assembly snatch hole.
2. Adjust the clamp so the jaws just close when the wire rope is clamped in the grooves in the blocks.
3. While running the stage in the up direction, guide the wire rope onto the drum using a wooden pry bar inserted into the prybar socket on the upper frame.
4. Do not run a splice into the tensioning blocks. When all the wire rope has been installed, apply the regular tension holder and remove the clamp.

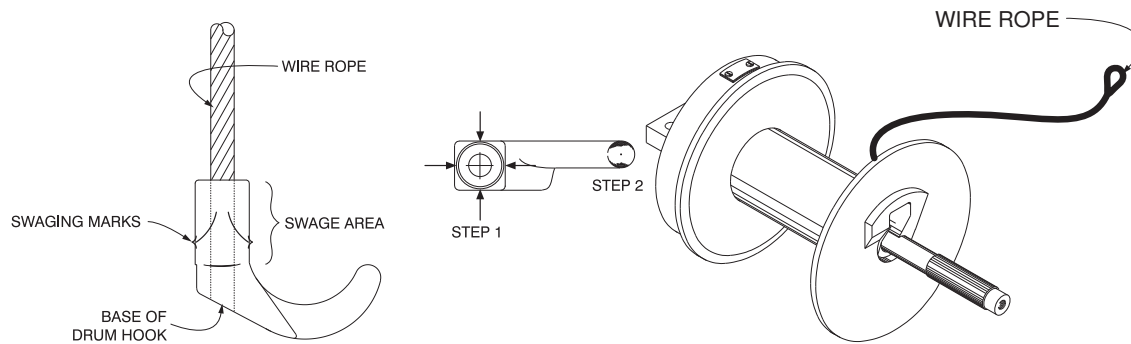
### ***Caution***

- Make sure the wire rope is well lubricated. It should have no kinks and no broken or abraded wires.
- If the clamp is damaged or worn, do not attempt to repair it. Contact your local Spider representative for repair or replacement.
- Use the clamp only to apply tension to the wire rope as instructed above—it has no other use.

## Swaging the drum hook

The Spider drum hook can be swaged by a press with a straight-channel die that has a 3/4-inch diameter channel. A rigging loft in your area can provide assistance.

1. Insert wire rope flush with base of hook.
2. Swage this area with a standard 3/8-inch Esco swaging die or equivalent.
3. Completely insert the hook in the die for maximum strength. Protruding swaging marks on the hook means it is not correctly inserted. These marks will prevent the hook from entering the drum pocket.

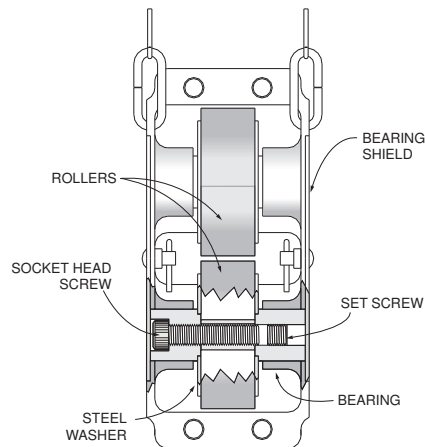




## ***LSR-1 COMPONENTS***

### ***TENSION HOLDER (701061-1)***

The tension holder is designed to keep the wire rope tight on the drum when you must slacken the rope from the rigging. It is necessary to keep the wire rope evenly spooled on the drum to ensure level winding, and prevent the wire rope from bird-nesting.



### ***Inspection***

Visually inspect the rubber rollers before each use. (There is no need to disassemble the tension holder, but definite signs of wear require a more thorough inspection.)

At the first sign of wear and at least every 30 days, apply tension to the rope by pulling or hanging a load on it to prevent it from bird-nesting, remove the wing nut from the locking cam and remove the pin and cam from the assembly. For reassembly, note how the two steel straps extend through the roller assembly. Pull the tension holder assembly halves apart. Examine the four rollers for deep grooves or flat spots. Spin each roller to make sure the bearings are free and properly lubricated.

If no further service is required, reassemble the tension holder assembly halves with the wire rope between them. Install the cam, screw and wingnut so the roller tightens on the wire rope when the handle is pushed down.

### ***Service***

If the bearings need lubrication, remove the 4 bearing shields (located on each side of the roller assemblies). Pack the bearings with bearing grease and replace the shields.

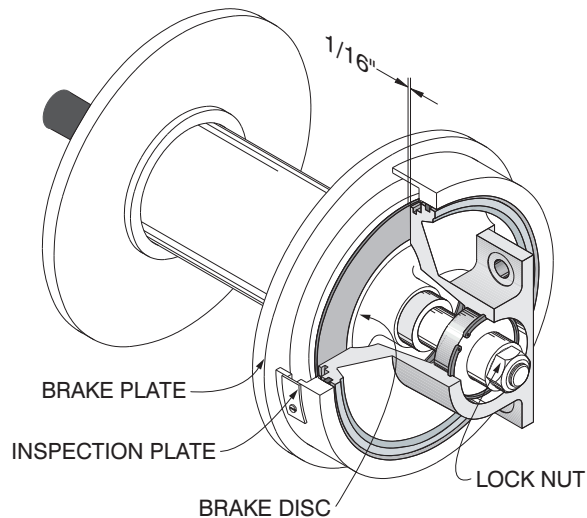
If either the bearings or the rollers need to be replaced, remove both halves of the tension holder assembly from the extension. Remove and replace the bearings and rollers as follows.

1. With the bearing shields removed, remove the setscrew from the bearing. Prevent the roller from turning and loosen the socket head screw located in the bearing. Replacement parts are available from your Spider representative.
2. Reverse step 1 to reassemble the tension holder. Be sure to center the two steel washers on each side of the roller around the centerline of the roller. The bearings are inserted through the housing and seated into the washers. The screw passes through one bearing, the washers and roller and then screws into the opposite bearing.
3. Pack the bearings with grease before assembling the bearing shields.
4. Reattach half the tension holder assembly to the extension. Install the other half and secure it with the locking cam, screw and wingnut.

## **WIRE ROPE DRUM & AUTOMATIC EMERGENCY BRAKE**

The wire rope drum collects the wire rope. It is made of aluminum with a steel shaft. The automatic emergency brake is totally enclosed in one end of the drum and is designed to stop the descent of the stage if the transmission fails.

If an overspeed condition causes the brake to activate, it can be reset automatically by running the transmission in the UP direction. You must then have the brake and transmission inspected by a service technician before returning the equipment to operation.



### ***30-day inspection***

Inspecting the drum and brake should be done by someone you or the employer knows is trained and knowledgeable. Every time you replace the wire rope, inspect the drum for damage. Before the LSR-1 is sent to the job site and every 30 days thereafter, inspect the automatic brake.

1. Remove the inspection plate on the drum flange opposite the transmission. The brake disc is visible inside.
2. Move the disc back and forth to make sure it moves freely. As the brake plate is turned in one direction, it will move laterally toward the bearing housing. When released, it should automatically return to its seated position, and it should be about 1/16-inch away from the bearing housing when seated. You can use the inspection hole cover as a feeler gauge, but be sure to clean it of excess paint or contaminants first. Be sure to replace the cover and gasket with the two screws when the inspection is completed.
3. Inspect the seal between the bearing housing and the cable drum to make sure it is in place. Inspect the locknut on the end of the drum shaft to see that it is in place and secure.

### ***Service***

If the drum or automatic brake need service, contact your local Spider representative.

## ***WIRE ROPE LEVEL WIND SYSTEM***

The level wind system spools the wire rope evenly on the drum when the extension assembly is used. It keeps the wire rope perpendicular to the drum by allowing the drum to tilt. A spring controls the amount of drum tilt. The wire rope must be evenly spooled on the drum to ensure level winding.

### ***Inspection***

Every day the operator should inspect the wire rope spooling on the drum to make sure it is stored neatly. If the wire rope is allowed to go slack or become unevenly wound, the level wind system will not function properly and the wire rope will be damaged.

Every 30 days and before each use inspect the drum base for damage. Check the two pivot pins for wear and make sure they are properly secured with the cotter pins. Check the tilt control spring assembly to ensure that it resists the tilting of the drum.

If the drum base or tilt control spring assembly need service, contact your local Spider representative.

## ***TRANSMISSION***

The LSR-1 has a worm gear transmission. Failure of the worm and worm gear could result in an uncontrolled descent of the stage or platform that is being supported by the LSR-1.

### ***Inspection***

Every 30 days (sooner if there are oil leaks) someone you or the employer know is trained and knowledgeable must inspect the oil level in both sections of the transmission through the inspection hole. If the level is below the inspection hole, fill with Mobil SHC 634 cylinder oil. Use no substitutes.

At the same time, inspect the steel worm from the inspection hole and bronze worm gear from the filler hole. Tip the assembly to keep the oil from draining out. The width of the tooth on a new steel worm or bronze worm gear is approximately 1/16-inch. If the edges of the teeth on the bronze worm gear or steel worm are getting sharp or if the steel worm is pitted, rusted or worn, the worm and worm gear must be replaced as a matched set by your local Spider representative.

Every 12 months (sooner, if needed) drain the oil from both sections of the transmission and replace with new Mobil SHC 634 cylinder oil. Use no substitutes. Two quarts will fill both sections.

## ***OVERLOAD VALVE***

The overload valve limits the amount of load that can be applied to the wire rope. This keeps a safety factor on the wire rope and rigging and prevents overworking the hoist motor. The overload valve is activated by the overload bolt, and stops the air motor from operating in the up direction. When an overload condition occurs, you must reduce the applied load before the overload valve will open and allow the winch to operate.

### ***Inspection:***

Every 30 days, or before installation on a new job, the overload shut-off valve should be inspected for proper operation by someone you or the employer know is trained and knowledgeable. Inspect the overload valve in the following manner:

1. Check that the valve stem moves freely in and out of the valve body. Lubricate the exposed portion of the valve stem.
2. With all the wire rope stored neatly on the drum, load the free end of the rope with the rated working load as shown on the load rating plate.
3. When connected to a proper air supply, the staging should lift the load.

4. With the addition of another 100 lbs., the overload shut-off valve should prevent upward travel of the stage. If this does not occur, adjust the overload bolt as described below.

### ***Service***

1. If the overload shut-off valve actuates at too light a load, adjust the overload bolt down. The opposite is true for too heavy a load. The jam nut can be loosened with a wrench.
2. Index the adjustment bolt one turn at a time until the proper setting is reached.
3. Reset the jam nut.
4. If the overload shut-off valve assembly needs further service, contact your Spider representative.

### ***CONTROL VALVE***

The LSR-1 has a 4-way positive-centering spool valve with one stop position in the center. The valve is sealed to help prevent contamination.

### ***Inspection & service***

The operator should test the control valve in both directions before each work shift. Any unusual behavior in operation requires a further inspection by someone you or the employer knows is trained and knowledgeable.

Every 30 days, or before being sent out to a new job:

1. With the proper air supply connected to the LSR-1, operate the valve in both directions and make sure the drum turns in the correct direction. Be sure to keep the wire rope from going slack on the drum when doing this.
2. Examine the handle and control valve to make sure it is secured and not damaged in a way that would prevent its correct use.

If the control assembly needs further service, contact your Spider representative.

### ***AIR MOTOR***

The air motor is a totally enclosed vane type motor rated at 1 1/4hp, with 120psi and 60cfm air. The air hose supply line needs to be at least 3/4-inch inside diameter in order to get maximum horsepower.

### ***Inspection and service***

The operator should refer any unusual behavior (such as loss of power) to someone who is known by you or the employer to be trained and knowledgeable for further inspection. See *Troubleshooting the air hoist*.

Every 30 days, or before installation at a new job site, someone who is known by you or the employer to be trained and knowledgeable should inspect the motor.

1. The cover fasteners must be secure, but do not overtighten.
2. Inspect the housing for any signs of damage.
3. Make sure the air hoses are properly secured and not damaged.

If the air motor needs further service, contact your Spider representative.

## OILER & FILTER

The filter helps to remove dirt, water and other contaminants from the incoming air supply. The oiler supplies a metered amount of lubricant for the motor.

### CAUTION

*These units are intended for use with industrial compressed air systems only. They must not be used where the pressure or temperature may exceed the maximum rated operation conditions.*

### Inspection and service

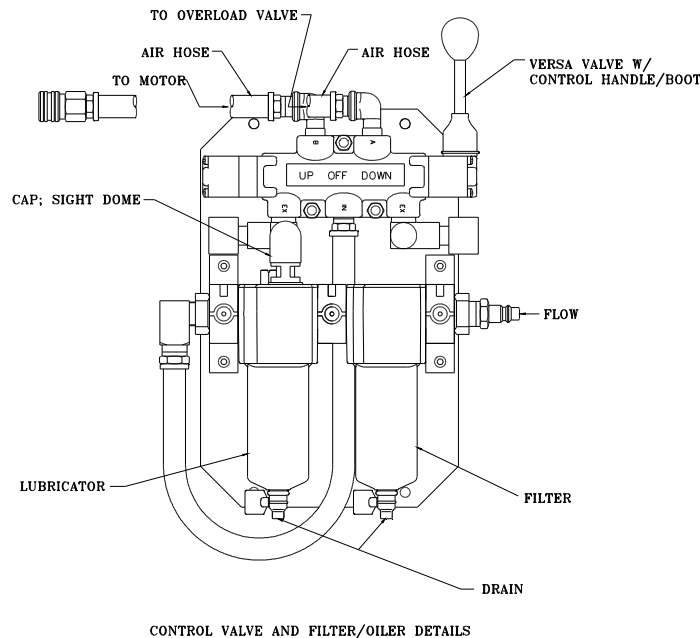
Disconnect the air supply before proceeding.

Drain the filter at least once a day and more frequently if necessary. To drain, loosen the thumbscrew located on the bottom of the filter. After the water has drained, reset the thumbscrew. Inspect the oiler daily. Remove filler cap on top of the oiler assembly and fill with Mobil Almo Oil No. 525.

Every 30 days (sooner if needed) remove and clean the filter screen as follows. When operating under extreme conditions such as sandblasting, clean the filter daily.

1. Remove the filter bowl (twist and remove). Unscrew the baffle at the bottom of the filter, and then remove the filter element.
2. Clean the parts with warm water and soap. Blow air through the filter element in the direction opposite that of normal airflow to dislodge surface contaminants. Dry all parts and blow out internal passages in body using clean dry compressed air. Replace any damaged parts.
3. Replace the filter element and baffle as they were removed and torque the baffle finger tight. Apply a coat of Dow Corning 44M grease (or equivalent) to the o-rings and reinstall the filter body.

The oiler adjustment screw is located under the cap on the top of the assembly. Turn counterclockwise to increase the drip rate and clockwise to decrease. Adjust while running motor at full throttle in UP direction. Set oil drip rate at 3-4 drops/minute.



## ***FRAME***

The frame is constructed of high strength aluminum alloys with heliarc-welded joints.

### ***CAUTION***

***The frame is constructed from tempered metal. Do not use heat to clean off excess paint. If welding repairs are needed, they must be made by welders certified to AWS standards, and in compliance with AWS structural welding code D1.2-97 (or current revision). Contact your Spider representative.***

### ***Inspection & service***

Daily, the operator should check for and report any damage. The safety information in the beginning of this manual and posted on the Spider equipment lists some of the ways the equipment can be damaged.

Every 30 days, or before installing on a new job, inspect the frame thoroughly for damage. Wire brush or scrub the excess paint away from suspected joints and inspect for cracks.

## ***TROUBLESHOOTING THE AIR HOIST***

### ***Motor is running slowly, losing power***

Low air volume; Check the air supply pressure at hoist—there should be 90psi with the motor running and the control valve wide open. Lower pressure indicates the need for a larger compressor or larger hose/fittings.

Not enough oil or too much oil; Check the lubricator—make sure it's clean, full of oil, and correctly adjusted (3-4 drops/minute).

Plugged air filter; Disassemble and clean.

Swollen vanes, badly worn vanes or worn front rotor bearing; contact your local Spider representative for service.

### ***Motor is sluggish in down direction***

Too much oil; Is lubricator correctly adjusted? Run the motor in down direction until it has discharged excess oil and is running normally.

### ***Motor will not move in either direction***

Disassembly shows no visible wear or scoring on any parts. Swollen vanes; contact your local Spider representative for service.

## ***STORING AND TRANSPORTING***

Always store and transport your LSR-1 in the upright position. This will help prevent the possibility of oil leakage in the transmission.

Always store your equipment in a sheltered dry area. If the equipment is left out in the weather, be sure to inspect the wire rope and other components for rust and corrosion. After long periods of storage under any conditions, the equipment should be thoroughly inspected before used.

Every 30 days connect the LSR-1 to a proper compressed air supply and run at least a couple of revolutions to lubricate the gears.

## *Notes*



## ACCESSORY EQUIPMENT

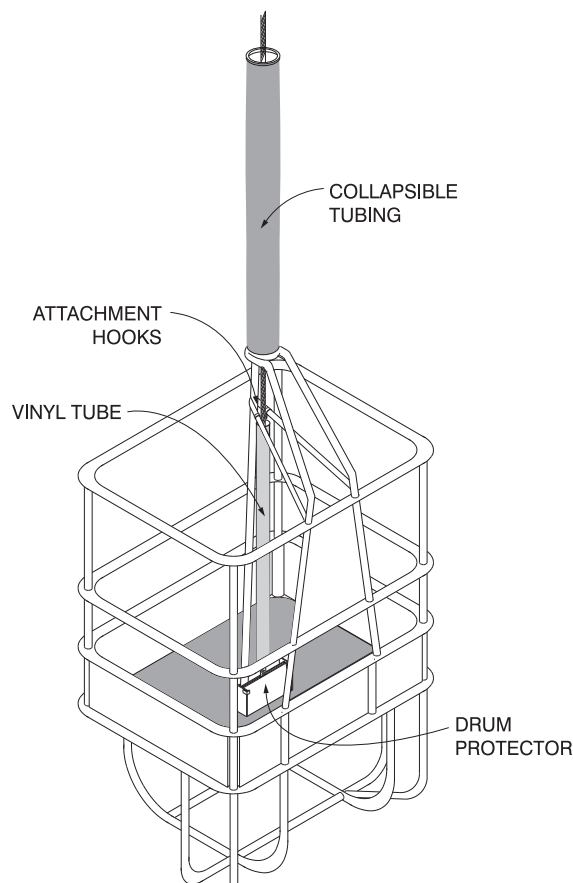
The Spider Arc Guard Kits and Wire Rope Insulators are designed to prevent damaging or cutting the suspension wire rope when welding onboard Spider stages and platforms. However, because the Spider is grounded, insulating the wire rope and installing the arc guard kit will not prevent damage if the bare wire rope is struck with a welding rod or electrode. All precautions possible must be taken to prevent this from occurring (see complete list of precautions at the beginning of this manual). Refer to OSHA 29 CFR Part 1926.451(f)(17) for current laws and ANSI A10.8 paragraph 6.2.9 for current safety standards to follow when using suspended stages for welding.

The examples shown here demonstrate the use of the Spider Arc Guard Kits and Wire Rope Insulators with Spider drum hoist stages, however they can also be used with Spider traction hoist powered platforms. Contact your Spider representative for the requirements when using these products with platforms not shown here.

### ARC GUARD KITS (SA-1083 and SA-1083-1000)

The arc guards protect the suspension wire rope by preventing accidental contact with a welding rod or electrode, and prevent weld splatter from falling onto the drum. At the same time they permit the operator to observe the wire rope as it spools on and off the drum.

The SA-1083 will fit the 9-inch drum hoist, and the SA-1083-1000 will fit the 16-inch drum hoist.



## ***Assembly***

1. Loosen the 4 bolts on the drum protector [Spider P/N 700947-1 (9 inch) or 700953-1 (16 inch)]. Slide it down over the toeboard. Tighten the bolts to clamp it to the toeboard.
2. Unwrap the velcro straps from the arc guard mid-assembly (Spider P/N 1581). Spread the tube open and place it over the wire rope between the toeboard and the tension holder. Wrap the Velcro straps around the tube to hold it closed. Hang the two hooks on the tripod.
3. Thread the collapsible tubing (Spider P/N 4485) onto the wire rope. You might need to attach a piece of wire to the rope eye to help pull it through. The tubing rests on the top of the wire rope guide when the staging is rigged.

## ***Inspection***

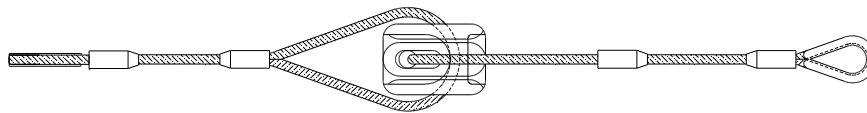
1. At the beginning of every work shift look for damage to the component parts. Do not use the equipment if it needs repair.
2. The clear tubing and doors on the drum protector are for wire rope inspection. Keep them clean with detergent or paint solvent. Do not use lacquer thinners.
3. The collapsible tubing allows the staging to be moved close to the rigging. The tubing should not collapse more than half its original length or it could be damaged.

## ***WIRE ROPE INSULATOR (Spider P/N 4897 AND 701075-1)***

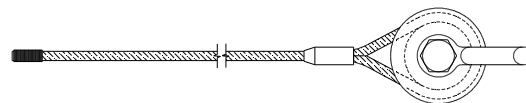
When welding from a suspended stage the suspension wire rope must be insulated from the overhead rigging. The wire rope insulators provide an effective means of insulating the suspension rope from the LSR-1 or other overhead rigging.

## ***Assembly***

1. On Spider P/N 4897, inspect the ceramic insulator block, wire rope and splices. Do not use if any of these components are damaged. Clean any soot or weld splatter off the insulated thimble.
2. On Spider P/N 701075-1 inspect the insulated thimble, wire rope, splice and shackle. Do not use if any of these components are damaged. Clean any soot or weld splatter off the insulated thimble.
3. Attach one end of the insulator assembly to the overhead rigging point. It may be necessary to use a bolt-type anchor shackle.
4. Attach the other end of the insulator assembly to the suspension wire rope. Use a bolt type anchor shackle.
5. Secure and tighten the bolt, nut, and cotter pins of the shackles.



WIRE ROPE INSULATOR ASSEMBLY  
(P/N 4897)



WIRE ROPE INSULATED THIMBLE ASSEMBLY  
(P/N 701075-1)

## ***WIRE ROPE INSPECTION REPORT***

Machine	Owned by
Machine location	Manufacturer's ID#
Rope application	
Rope description	
Date of inspection	Applicable standards

### ***Criteria for removal of rope from service***

<b><i>Wire rope</i></b>	<b><i>Location on wire rope</i></b>				
Reduction of .0156 in. of the diameter (record measured diameter and location)					
6 broken wires in 1 rope lay					
3 broken wires in 1 strand of 1 lay					
Excessive wear of 1/3 of outside wire diameter					
<b><i>End attachments</i></b>					
1 broken wire					
Corrosion of rope--reduction of diameter of .0156 in.					
Splice and fitting--excessive wear of 1/3 of outside wire diameter					
<b><i>Other</i></b>					
Look for damage--rope must have 3 ton minimum strength					
Kinks, flattening, erosion					
Make sure rope is properly lubricated					